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A DICTIONARY
OF
MODERN GARDENING.

BY
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CORRESPONDING MEMBER OF
THE ROYAL CALEDONIAN AND MARYLAND HORTICULTURAL SOCIETIES;
AUTHOR OF THE PRINCIPLES OF PRACTICAL GARDENING;
THE GARDENER'S ALMANACK, ETC

WITH
ONE HUNDRED AND EIGHTY WOOD CUTS.

EDITED, WITH NUMEROUS ADDITIONS,

BY DAVID LANDRETH,

OF PHILADELPHIA.

PHILADELPHIA:
LEA AND BLANCHARD.
1847.

TO
JOHN LINDLEY, PH. D., F. R. S.,

VICE SECRETARY OF THE HORTICULTURAL SOCIETY OF LONDON, AND PROFESSOR OF
BOTANY IN UNIVERSITY COLLEGE,

AS ONE OF THE MOST EFFICIENT

PROMOTERS OF MODERN HORTICULTURE,

THIS VOLUME

IS DEDICATED BY

THE AUTHOR.

Entered, according to the Act of Congress, in the year 1847, by
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AUTHOR'S PREFACE.

UTILITY, more than either originality of contents or elegance of phraseology, has been the author's principal object in the following pages. He has endeavoured to gather together in one volume, attainable at a moderate price, an arranged, easily consulted, record of Gardening, as it is. To effect this object, he has obtained aid from the best living authorities, as well as from their published works; but he has not neglected those of other periods, where he has found in them directions upon which the moderns have suggested no improvements. Of all the authorities consulted, none has afforded such abundant information as the *Gardeners' Chronicle*, of which it is not too much to say that, as it is the best of modern journals devoted to promoting the cultivation of the soil, so, whoever is fortunate enough to possess a complete copy of its five published volumes, has a work of reference from which he will rarely turn away unsatisfied if seeking for information relative to its peculiar subjects.

In every instance, the author has endeavoured to give tribute where due, and if he has erred in this, or in any other particular, he will be highly obliged by correction. Besides the work already quoted, he has been much indebted to PAXTON'S *Botanical Dictionary*; WHATELEY'S *Landscape Gardening*; GLENNY'S *Practical Gardener and Florist*; MAUND'S *Botanic Garden*; LINDLEY'S *Theory of Horticulture*; and *The United Gardener and Land Steward's Journal*. The author does not wish to mislead his readers into the belief that this is a Botanical Dictionary. On the contrary, he has confined his notices to such genera of plants as deserve a place in some department of the garden; and, for the most part, even in enumerating the number of species in each genus, only those have been reckoned that are worthy of cultivation.

It only remains to be explained that, in the monthly calendars, b. intends the *beginning*, or first half of the month, and e. the *end*, or its closing half.

The following works have also been freely consulted and quoted:—

CUTHBERT JOHNSON, *On Fertilizers*.

————— *Farmers' Encyclopædia*.

LOUDON AND WESTWOOD'S *Kollar on Predatory Insects*.

LOUDON'S *Gardeners' Encyclopædia*.

————— *Gardeners' Magazine*.

JOHNSON'S *Principles of Gardening*.

ABERCROMBIE'S *Gardeners' Dictionary*.

JOHNSON'S *Gardeners' Almanack*.

Transactions of the London Horticultural Society.

Caledonian Horticultural Transactions.

Horticultural Magazine.

DECANDOLLE'S *Philosophy of Plants*.

PREFACE TO THE AMERICAN EDITION.

THE ordinary form in cases of reprint, with additions and explanatory notes, has been departed from in the present instance with a desire to preserve the book from the awkward aspect which it would necessarily present, if every addition by the American editor had been included within brackets, or printed in varied type.

This edition has been greatly altered from the original. Many articles of little interest to Americans have been curtailed, or wholly omitted, and much new matter, with numerous illustrations, added; yet the present editor freely admits, and has desired the publishers to state, that he has only followed in the path so admirably marked out by Mr. Johnson, to whom the chief merit of the work belongs. It has been an object with the publishers, and editor, to increase its popular character, thereby adapting it to the larger class of horticultural readers in this country, and they trust it may prove what they have desired it to be, an Encyclopædia of Gardening, if not of Rural Affairs, so condensed as to be within reach of most persons whom those subjects interest.

THE PUBLISHERS.

PHILADELPHIA, *April*, 1847.

NOTE.

It is evident that with a territory extending over so large a space, a monthly calendar, or direction for cropping, &c., cannot uniformly apply: Those who reside north or south of Pennsylvania, can readily make the necessary calculations as to time.

THE

GARDENERS' DICTIONARY.

ABE

ABELE TREE. (*Populus alba*.)

ABLACTATION, the same as **IN-ARCHING**, and so called because it is a gradual withdrawing of the scion from its parent, the same as weaning, which in Latin is *ablactatio*.

ABLAQUEATION, baring the bodies of a tree's main roots. This was an old mode of checking the tree's over luxuriance, for the purpose of making it fertile. A much less injurious plan is to drain the soil, and mix it with sand, chalk, or other less rich addition. Another method successfully pursued is to open a trench around the body, at a suitable distance, thus shortening the roots, and arresting the tree's rapid growth.

ABNODATION, cutting off excrescences and the stumps of branches close to the stem. The intention of this is to have the wound heal over, but it is very doubtful, in the case of branches, whether the extremity of a stump properly treated will not heal quicker than a wound close to the trunk. The unsightly aspect of protruding stumps will, however, induce close pruning.

ABRICOCK, an old mode of spelling *APRICOT*, *Armeniaca vulgaris*.

ABRAXAS *grossularia*. Magpie Moth. The caterpillar of this moth often infests the leaves of the gooseberry bush, as well as the currant, sloe, and even the peach, in early summer. "The caterpillar," says Mr. Curtis, "is white, slightly tinged with blue, and having numerous black spots on the back; it is called a looper, from its peculiar mode of walking; it fixes itself first firmly with its hind feet, and then extends its body fully; after which it puts down its fore feet, and draws the hind part of its body as close after them

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as possible, thus forming an arch or loop."—*Gard. Chron.*

ABROMA. Two species. Stove evergreen shrubs. Seed or cuttings. Loam and peat.

ABRONIA. Two species. Hardy perennial trailers. Rooted slips. Sandy peat.

ABRUS *precatorius*. Wild Liquorice. Stove climber. Cuttings. Sand and peat.

ABUTA *rufescens*. Stove evergreen climber. Rooted slips. Loam and peat.

ABUTILON. Three species. One stove, and two green-house evergreen shrubs. Cuttings. Light rich loam. *A. striatum*. Green-house shrub. "As this seems likely to suit a bed in the flower garden, to increase it keep it in the stove, as it will there push even in winter, and every two joints will be sufficient for a cutting, which will make a plant in a fortnight or three weeks. By the time the cutting has pushed far enough to admit of being topped, another cutting may be made of it, and proceeded with as before. If kept in the green-house during winter it will not move at all."—*Gard. Chron.*

ACACIA. 274 species, stove and green-house evergreens. Cuttings. Sandy loam and peat.

ACÆNA *splendens*. Green-house evergreen. Seed. Loam and peat.

ACANTHOPHIPPIUM. Three species. Stove epiphytes. Offsets. Sandy peat and light loam.

ACANTHUS. Bear's Breech. Eight species. Six hardy herbaceous perennials; division of roots. One green-house perennial; seed. One stove evergreen; cuttings. All require sandy peat and loam.

ACARUS, the Plant Mite. Class

Arachnidæ. The following are the chief of those known to the gardener. *Acarus tellarius*, the Red Spider, is one of the gardener's most troublesome foes. Its colour varies from yellowish to red-brown, and though almost invisible from its minuteness, yet it preys most destructively upon some trees and herbaceous plants in our hot-houses, as well as upon the kidney-bean, lime tree, &c., out of doors in dry summers. *A. holosericeus* is another species, distinguishable to an unsciened eye chiefly by its scarlet colour. To destroy them in the hothouse, there is no plan so effectual as heating the flues or pipes, and sprinkling upon them sulphur. The air is thus gently impregnated with the vapour of sulphur, for it begins to evaporate at a heat of 170°. This vapour is fatal to the insect where the air is thoroughly impregnated with it, and the work of destruction is completed by syringing the infested plants with water. This last is the only practical remedy to plants in our borders, unless they can be covered over so that the fumes may be confined, whilst the sulphur is volatilized over a hot-water plate. Potted plants may be submitted to the vapour of sulphur in a similar way. The vapour of spirit of turpentine is said to be as effectual as sulphur. *Acarus hortensis*, the Garden Mite, thorax ochreous, abdomen white, has been found upon the roots of the cucumber, upon which it is said to prey. I believe it to be the same *Acarus* often so abundant upon the root of cabbages affected with the Ambury. *A. geniculatus* is a minute, red, shining mite, gregarious, and congregating during spring in prodigious numbers upon the bark of the plum and other fruit trees, near the base of the twigs, and looking like a gummy exudation. By extracting the sap they doubtless weaken the tree, and reduce its productiveness.—*Gard. Chron.*

ACER. Maple. Twenty-seven species, all hardy trees except *Acer oblongum*, which is half-hardy. The Sugar Maple, *A. saccharinum* of the American forests, is perhaps one of the finest species. It forms a full round head, its deep green leaves changing in autumn to many shades of orange. The Silver Maple, *A. desycarpum*, is a light airy tree, of quick growth, and extensively planted in the streets of Philadelphia. *A. platanoides*, or Norway Maple, and

A. pseudo-platanoides, or Sycamore, are also desirable varieties. Seed, cuttings, and layers. Common light garden soil.

ACERAS. Two species, both tuberous-rooted hardy perennials. Seeds. Light loam.

ACERATIUM *oppositifolium*. Stove evergreen shrub. Peat and loam. Cuttings.

ACETARIOUS PLANTS. *Salading*.

ACCLIMATIZATION is rendering a plant capable of the production desired in a climate differing from that in which it is native. In our climate it is usually required to induce a plant to endure lower temperatures than those to which it has been accustomed, and this, though some are intractable, is more easy than is inducing the natives of colder regions to live in our latitudes. When a new plant arrives from a tropical country, it is desirable to use every precaution to avoid its loss, but so soon as it has been propagated from, and the danger of such loss is removed, from that moment ought experiments to commence, to ascertain whether its acclimatization is attainable. That this should be done is self-evident; for the nearer such a desirable point can be attained, the cheaper will be its cultivation, and consequently the greater will be the number of those who will be able to derive pleasure from its growth. Hence it is very desirable that an extended series of experiments should be instituted, to ascertain decisively whether many of our present green-house plants would not endure exposure to our winters, if but slightly or not at all protected. It may be laid down as a rule, that all Japan plants will do so in the southern states, but it remains unascertained to what degree of northern latitude this general power of endurance extends. Experiment, and experiment only, ought to be relied upon; for we know that the larch was once kept in a greenhouse in England. Many tropical plants of every order and species, have been found to require much less heat, both during the day and during the night, than gardeners of a previous century believed. Other plants than those already noticed have passed from the tropics to our parterres, and even to those of higher northern latitudes. The horse chestnut is a native of the tropics, but it endures uninjured the stern climate of Sweden. *Aucuba Japonica* and

Pæonia Moutan, we all remember to have passed from our stoves to the green-house, and now they are in our open gardens. Every year renders us acquainted with instances of plants being acclimatized: and, in addition to those already noticed, we find that Mr. Buchan, Lord Bagot's gardener, at Blithfield House, in Staffordshire, has an old cinnamon tree (*Laurus Cinnamomum*) under his care, which ripens seed: from these many plants have been raised that endure the winters of England in a conservatory without any artificial heat. Then, again, there is no doubt that all the coniferæ of Mexico, which flourish there at an elevation of more than 8000 feet above the sea's level, will survive our winters in the open air. Among these are *Pinus Llavedna*, *P. Teocate*, *P. pitula*, *P. Hartwegii*, *Cupressus thurifera*, *Juniperus flaccida*, *Abies religiosa*, and some others. Many natives of the southern states have been gradually acclimated in Pennsylvania; experience has, however, demonstrated that the nature of the soil is all-important. On sandy or light loamy land with gravelly subsoil, many plants are found to withstand the winter, which would surely perish on heavy or wet land. So also the aspect as regards exposure to the sun, it having been found from repeated observation that tender plants, especially if evergreen, suffer less from cold when screened from the sun's rays. The cause is obvious. An extensive importation of European Holly received at the Landreth Nurseries, were, as a protection from the summer sun, planted on the north side of a high board fence, where they safely resisted the severity of winter: subsequently they were placed in open positions, and all were killed by the combined action of heat and cold. The following general rules are the results of experiments in the London Horticultural Society's Garden, conducted by Mr. Gordon. 1. "Plants intended to be acclimatized, should never be subjected to artificial heat during the winter that precedes their being planted out; if obtained from seeds, as little heat as possible should be employed in raising them; and starved or stunted plants are more likely to succeed than such as have been forced into a rapid and luxuriant growth. 2. The plants should not be committed to the open ground earlier than the end of

May; the soil should be poor, dry, and thoroughly drained; if against a wall, the border should be protected through the entire winter by a roof of hurdles thatched with straw, and projecting about three feet."

ACHILLEA. Milfoil. Sixty-four species, all, except *A. Ægyptica*, herbaceous perennials. Common garden soil. Division of roots. *A. Ægyptica* is a green-house evergreen. Cuttings. Peat and loam.

ACHIMENES. Six species. Stove bulbs. "After the plants have done flowering, and the tops die down, in November, allow the bulbs to remain undisturbed in the pots, laid on their sides beneath the green-house stage, or some other place where frost and wet cannot reach them, where they may remain until the latter part of January, then to be placed in a gentler heat, and watered until the soil becomes sufficiently moist to encourage vegetation. When the small scaly bulbs have made shoots about two inches in length, plant them singly in small sixties, in a mixture of leaf mould and a small portion of silver sand. At the subsequent shifting, until the plants are finally placed in sixteens in June, the compost consists of light rich turf loam and peat, or leaf mould, when peat cannot be procured in equal proportions, and on no account sifted. The pots are thoroughly drained, a point which forms the basis of all good culture, both in pots and in the open ground. For growing several plants in one pot, take No. 12 size, into which turn five of the plants previously kept in sixties, placing one in the centre, and four round the edges. These form a noble mass when in bloom; but never assume the uniform conical shape of a single specimen. The main stem and side branches are to be neatly sticked and tied out as they advance in growth. The temperature of an early vinery is well adapted for these plants until the end of May, at which period they should be taken to a cool pit, where a steady moist heat can be maintained. They should be shaded in hot days between 11 A.M. and 2 P.M., to prevent the sun from scorching the foliage, and they should never be watered overhead. The pots should be placed upon others, inverted, and the bottom of the pit should be kept moist, closing up early in the afternoon, and giving air in

clear weather about eight in the morning, so that the damp may disperse before the rays of the sun fall directly upon the plants."—*Gard. Chron.*

A. Longiflora. "The bulbs of this may be started in a warm cucumber frame towards the end of February. Each plant, when it has formed a few leaves, should then be potted off, separately, into small pots, or, preferably, several may be planted together in a shallow box. The temperature of a warm green-house suits them admirably."—*Gard. Chron.*

ACHYRONIA villosa. Green-house evergreen shrub. Cuttings. Peat and loam.

ACIANTHUS. Three species. Tuberous green-house plants. Division. Loam and peat.

ACICARPHA spatulata. Herbaceous stove perennial. Division. Loam and peat.

ACIOTIS. Two species. Stove evergreen shrubs. Cuttings. Peat and loam.

ACIS. Four species. Hardy bulbs. Offsets. Sandy loam.

ACISANTHERA quadrata. Stove evergreen shrub. Cuttings. Peat and loam.

ACMADENIA tetragona. Green-house evergreen shrub. Cuttings. Loam and peat.

ACMENA floribunda. Green-house evergreen shrub. Cuttings. Sandy loam.

ACONITUM. Eighty species hardy deciduous tubers; and thirty-four species hardy herbaceous perennials. "*A. Napellus*, from *napus*, a turnip, its grumous roots resembling little turnips, is a well known poisonous plant. Linnaeus says, that it is fatal to kine and goats, especially when they come fresh to it, and are not acquainted with the plant; but that it does no injury to horses, who eat it only when dry. He also relates (from the Stockholm Acts) that an ignorant surgeon prescribed the leaves, and on the patient refusing to take them, he took them himself and died. The ancients, who were acquainted with chemical poisons, regarded the Aconite as the most violent of all poisons. Some persons, only by taking in the effluvia of the herb in full flower by the nostrils, have been seized with swooning fits, and have lost their sight for two or three days. But the

root is unquestionably the most powerful part of the plant. Matthioli relates, that a criminal was put to death by taking one drachm of it. Dodonæus gives us an instance, recent in his time, of five persons at Antwerp, who ate the root by mistake, and all died. Dr. Turner also mentions, that some Frenchmen at the same place, eating the shoots of this plant for those of masterwort, all died in the course of two days, except two players, who quickly evacuated all that they had taken by vomit. We have an account, in the Philosophical Transactions, of a man who was poisoned, in the year 1732, by eating some of this plant in a salad, instead of celery. Dr. Willis also, in his work *De Anima Brutorum*, gives an instance of a man who died in a few hours, by eating the tender leaves of this plant also in a salad. He was seized with all the symptoms of mania. The Aconite, thus invested with terrors, has, however, been so far subdued, as to become a powerful remedy in some of the most troublesome disorders incident to the human frame. Baron Stoerck led the way by administering it in violent pains of the side and joints, in glandulous scirrhi, tumours, ulcerous tubercles of the breast, &c., to the quantity of from ten to thirty grains in a dose, of an extract, the method of making which he describes."—*Encyc. Plants.* Division. Common garden soil. All are poisonous.

ACRONYCHIA cunninghami. Green-house shrub. Cuttings. Sandy loam and peat.

ACROPERA loddigesii. Stove epiphyte. Division. Peat and potsherds.

ACROPHYLLUM verticillatum. Green-house shrub. Cuttings. Loam and peat.

ACROSPIRE is the name whereby malsters, gardeners, and others describe the sprouts from barley and other seeds when germinating, and which are the radicle and plumule, the infant root and stem.

ACROSTICHUM. Sixteen species. Chiefly stove herbaceous perennials. *A. alcarne* and *A. grande* are green-house plants. Division and seed. Loam and peat.

ACROTRICHE. Three species. Green-house evergreen shrubs. Cuttings. Sandy peat.

ACTINOMERIS. Four species.

Hardy herbaceous perennials. Division. Peat and loam.

ACTINOTUS. Two species. Green-house herbaceous perennials. Division. Sandy loam.

ACYNOS. Eleven species. All hardy. Seeds. Dry sandy soil.

ADAMIA cyanea. Stove evergreen shrub. Cuttings. Peat and loam.

ADAM'S NEEDLE. *Yucca.*

ADDER'S TONGUE. *Opioglossum.*

ADELIA. Three species. Stove evergreen shrubs. Cuttings. Peat and loam.

ADENANDRA. Thirteen species. Green-house evergreen shrubs. Cuttings. Loam and peat.

ADENANTHERA. Two species. Stove evergreen shrubs. Cuttings. Sandy loam and peat.

ADENANTHOS. Three species. Green-house evergreen shrubs. Cuttings. Sandy peat and loam. *A. obovata* is best from seed.

ADENOCARPUS. Six species. *A. foliolosus* and *frankenioides* are evergreen shrubs. Cuttings. Sandy loam. The others are hardy deciduous shrubs. Seeds. Common garden soil.

ADENOPHORA. Sixteen species. Hardy herbaceous perennials. Common garden soil. Peat and loam.

ADESMIA. Eight species, of which *A. viscosa* is hardy. The others are green-house plants. *A. viscosa* and *us-pallatensis* are propagated by cuttings. The others from seed. All in sandy loam.

ADIANTUM. Maidenhair. Twenty-nine species. All green-house or stove plants, except *A. capillus veneris* and *pubescens*. They are hardy herbaceous perennials. Division. Loam and peat.

ADINA globiflora. Stove evergreen shrub. Cuttings. Sandy loam and peat.

ADLUMIA cirrhosa. Hardy climbing biennial. Seeds. Sandy loam.

ADONIS. Thirteen species. All hardy. Seed. Common garden soil.

ÆGIPHILA. Seven species. Stove evergreen shrubs. Cuttings. Loam and peat.

ÆGLE marmelos. Bengal Quince. Stove evergreen shrub. Cuttings. Loam.

ÆCHIMEA. Three species. Stove perennials. Suckers. Loam, peat, and sand.

ÆGOCHLOA. Six species. All hardy

annuals. Seeds. Light rich garden soil.

ÆOLLANTHUS suaveolens. Stove annual. Seeds. Sandy loam.

ÆONIUM Youngianum. Green-house. Cuttings. Sandy loam.

ÆSCHYNANTHUS. Two species. Stove epiphytes. Cuttings. Peat and potsherds, or wood.

ÆSCULUS. Horse-chestnut.

Æ. glabra. (Grafts.)

Æ. hippocastanum, flore pleno. (Layers.)

Æ. hippocastanum, fol. argenteis. (Layers.)

Æ. hippocastanum variegatum.

Æ. ohioensis.

Æ. pallida. (Grafts.)

Æ. rubicunda. (Grafts.)

All hardy deciduous trees. The common European horse-chestnut *Æ. hippocastanum*, is a truly magnificent tree, at once grand from its magnitude and massy form, and beautiful when in bloom from being covered with large spikes of white and pink flowers, protruding beyond its elegant digitate leaves. Seeds (except where otherwise described). Common garden soil.

AERANTHES. Two species. Stove epiphytes. Division. Peat and potsherds, or wood.

AERIDES, (air plant.) Nine species. All stove epiphytes. Cuttings, except *A. cornutum*, which is multiplied by root-divisions. Peat and potsherds, or wood.

ÆRUA. Two species. Stove herbaceous perennials. Cuttings. Rich moist soil.

ÆSCYNOMENE. Eleven species. *Æ. viscidula* a green-house, and *Æ. hispida* a hardy annual, the rest stove plants. Seeds. Sandy loam.

ÆTHIONEMA. Six species. All hardy. Seed or cuttings. Common soil.

ÆTHIONIA. Two species. Green-house evergreen shrubs. Cuttings. Common soil.

AFRICAN ALMOND. *Brabejum.*

AFRICAN FLEABANE. *Tarcho-nanthus.*

AFRICAN LILY. *Agapanthus.*

AFRICAN MARIGOLD. *Tagetes Erecta.*

AGAPANTHUS. African Lily. Three species. Nearly hardy bulbs. Common soil. Offsets.

AGASTACHYS odorata. Green-

house evergreen shrub. Cuttings. Loam, peat, and sand.

AGATHÆA. Two species. Green-house evergreen shrubs. Young cuttings. Loam and peat.

AGATHOPHYLLUM *aromaticum*. Madagascar nutmeg. Stove evergreen tree. Cuttings. Peat or rich loam.

AGATHOSMA. Twenty-two species. Green-house evergreen shrubs. Cuttings. Peat and loam.

AGATHYRSUS. Seven species. Hardy herbaceous. Cuttings and divisions. Common soil.

AGATI. Two species. Stove evergreen trees. Cuttings. Peat and loam.

AGAVE. Aloe. Nineteen species. Chiefly stove plants. Suckers. Rich loam. "The name is altered from *αγave*, admirable, which this genus may well be said to be, considering its appearance, its size, and the beauty of its flowers. In mythology, Agave is the name of one of the Nereids. *A. americana* is a popular succulent throughout Europe. It grows wild or is acclimated in Sicily, the south of Spain, and Italy, and is much used in the latter country, planted in vases as an ornament to piers, parapets, and about houses. About Milan and other towns in Lombardy, where it will not endure the winter, they use imitations of copper so well formed and painted, as to be readily mistaken for the original. In France and Germany it is still very common; and in this country formerly used to be the regular companion of the orange, myrtle, and pomegranate, then our principal green-house plants. An idea used to prevail that the American Aloe only flowered once in a hundred years; but, independently of this unnatural application of time to the inflorescence, it has long been known to flower sooner or later according to the culture bestowed on it."—*Encyc. Plants*.

AGERATUM. Six species. Chiefly hardy annuals. Seed. Light rich soil.

AGNOSTUS *sinuata*. Green-house evergreen tree. Cuttings. Sandy peat.

AGRICULTURE, as compared to Horticulture, is the culture and management of certain plants and animals for the food and service of man: it is, as Marshall observes, "a subject which, viewed in all its branches, and to their fullest extent, is not only the most important and the most difficult in rural economies, but in the circle of human

arts and sciences." It is "the basis of all other arts, and in all countries coeval with the first dawn of civilization. Without agriculture, mankind would be savages, thinly scattered through interminable forests, with no other habitations than caverns, hollow trees or huts, more rude and inconvenient than the most ordinary hovel or cattle-shed of the modern cultivator. It is the most universal as well as the most ancient of the arts, and requires the greatest number of operators. It employs seven-eighths of the population of almost every civilized community.—Agriculture is not only indispensable to national prosperity, but is eminently conducive to the welfare of those who are engaged in it. It gives health to the body, energy to the mind, is favourable to virtuous and temperate habits, and to knowledge and purity of moral character, which are the pillars of good government and the true support of national independence.—With regard to the history of agriculture, we must confine ourselves to slight sketches. The first mention of agriculture is found in the writings of Moses. From them we learn that Cain was a 'tiller of the ground,' that Abel sacrificed the 'firstlings of his flock,' and that Noah 'began to be a husbandman, and planted a vineyard.' The Chinese, Japanese, Chaldeans, Egyptians and Phenicians appear to have held husbandry in high estimation. The Egyptians were so sensible of its blessings, that they ascribed its invention to superhuman agency, and even carried their gratitude to such an absurd excess as to worship the ox, for his services as a labourer. The Carthaginians carried the art of agriculture to a higher degree than other nations, their cotemporaries. Mago, one of their most famous generals, wrote no less than twenty-eight books on agricultural topics, which, according to Columella, were translated into Latin by an express decree of the Roman senate.—Hesiod, a Greek writer, supposed to be cotemporary with Homer, wrote a poem on agriculture, entitled *Weeks and Days*, which was so denominated because husbandry requires an exact observance of times and seasons. Other Greek writers wrote on rural economy, and Xenophon among the number, but their works have been lost in the lapse of ages.—The implements of Grecian agri-

culture were very few and simple. Hesiod mentions a plough, consisting of three parts—the share-beam, the draught-pole and the plough-tail; but antiquarians are not agreed as to its exact form; also a cart with low wheels, and ten spans (seven feet six inches) in width; likewise the rake, sickle and ox-goat; but no description is given of the mode in which they were constructed. The operations of Grecian culture, according to Hesiod, were neither numerous nor complicated. The ground received three ploughings—one in autumn, another in spring, and a third immediately before sowing the seed. Manures were applied, and Pliny ascribes their invention to the Grecian king Augeas. Theophrastus mentions six different species of manures, and adds, that a mixture of soils produces the same effect as manures. Clay, he observes, should be mixed with sand, and sand with clay. Seed was sown by hand, and covered with a rake. Grain was reaped with a sickle, bound in sheaves, threshed, then winnowed by wind, laid in chests, bins or granaries, and taken out as wanted by the family, to be pounded in mortars or quern mills into meal.—The ancient Romans venerated the plough, and, in the earliest and purest times of the republic, the greatest praise which could be given to an illustrious character was to say that he was an industrious and judicious husbandman. M. Cato, the censor, who was celebrated as a statesman, orator and general, having conquered nations and governed provinces, derived his highest and most durable honours from having written a voluminous work on agriculture. In the *Georgics* of Virgil, the majesty of verse and the harmony of numbers add dignity and grace to the most useful of all topics. The celebrated Columella flourished in the reign of the Emperor Claudius, and he wrote twelve books on husbandry, which constituted a complete treatise on rural affairs. Varro, Pliny and Palladius were likewise among the distinguished Romans who wrote on agricultural subjects.—With regard to the Roman implements of agriculture, we learn that they used a great many, but their particular forms and uses are very imperfectly described. From what we can ascertain respecting them, they appear more worthy of the notice of the

curious antiquarian, than of the practical cultivator. The plough is represented by Cato as of two kinds—one for strong, the other for light soils. Varro mentions one with two mould-boards, with which, he says, ‘when they plough, after sowing the seed, they are said to ridge.’ Pliny mentions a plough with one mould-board, and others with a coulter, of which he says there were many kinds.—Fallowing was a practice rarely deviated from by the Romans. In most cases, a fallow and a year’s crop succeeded each other. Manure was collected from nearly or quite as many sources as have been resorted to by the moderns. Pigeon’s dung was esteemed of the greatest value, and, next to that, a mixture of night soil, scrapings of the streets and urine, which were applied to the roots of the vine and olive.—The Romans did not bind their corn into sheaves. When cut, it was sent directly to the area to be threshed, and was separated from the chaff by throwing it from one part of the floor to the other. Feeding down grain, when too luxuriant, was practised. Virgil says, ‘What commendation shall I give to him, who, lest his corn should lodge, pastures it, while young, as soon as the blade equals the furrow!’ (*Geor.*, lib. i., l. 111.) Watering on a large scale was applied both to arable and grass lands. Virgil advises to ‘bring down the waters of a river upon the sown corn, and, when the field is parched and the plants drying, convey it from the brow of a hill in channels.’ (*Geor.*, lib. i., l. 106.)—The farm management most approved of by the scientific husbandmen of Rome was, in general, such as would meet the approbation of modern cultivators. The importance of thorough tillage is illustrated by the following apologue: A vine-dresser had two daughters and a vineyard; when his oldest daughter was married, he gave her a third of his vineyard for a portion, notwithstanding which he had the same quantity of fruit as formerly. When his youngest daughter was married, he gave her half of what remained; still the produce of his vineyard was undiminished. This result was the consequence of his bestowing as much labour on the third part left after his daughters had received their portions, as he had been accustomed to give to the whole vineyard.—The Ro-

mans, unlike many conquerors, instead of desolating, improved the countries which they subdued. They seldom or never burned or laid waste conquered countries, but laboured to civilize the inhabitants, and introduce the arts necessary for promoting their comfort and happiness. To facilitate communications from one district or town to another, seems to have been a primary object with them, and their works of this kind are still discernible in numerous places. By employing their troops in this way, when not engaged in active service, their commanders seem to have had greatly the advantage over our modern generals. The Roman soldiers, instead of loitering in camps, or rioting in towns, enervating their strength, and corrupting their morals, were kept regularly at work, on objects highly beneficial to the interests of those whom they subjugated.—In the ages of anarchy and barbarism which succeeded the fall of the Roman empire, agriculture was almost wholly abandoned. Pasturage was preferred to tillage, because of the facility with which sheep, oxen, &c., can be driven away or concealed on the approach of an enemy.—The conquest of England by the Normans contributed to the improvement of agriculture in Great Britain. Owing to that event, many thousands of husbandmen, from the fertile and well-cultivated plains of Flanders and Normandy, settled in Great Britain, obtained farms, and employed the same methods in cultivating them, which they had been accustomed to use in their native countries. Some of the Norman barons were great improvers of their lands, and were celebrated in history for their skill in agriculture. The Norman clergy, and especially the monks, did still more in this way than the nobility. The monks of every monastery retained such of their lands as they could most conveniently take charge of, and these they cultivated with great care under their own inspection, and frequently with their own hands. The famous Thomas à Becket, after he was Archbishop of Canterbury, used to go out into the field with the monks of the monastery where he happened to reside, and join with them in reaping their corn and making their hay. The implements of agriculture, at this period, were similar to those in most common use in modern

times. The various operations of husbandry, such as manuring, ploughing, sowing, harrowing, reaping, threshing, winnowing, &c., are incidentally mentioned by the writers of those days, but it is impossible to collect from them a definite account of the manner in which those operations were performed.—The first English treatise on husbandry was published in the reign of Henry VIII., by Sir A. Fitzherbert, Judge of the Common Pleas. It is entitled the *Book of Husbandry*, and contains directions for draining, clearing and enclosing a farm, for enriching the soil, and rendering it fit for tillage. Lime, marl and fallowing are strongly recommended. ‘The author of the *Book of Husbandry*,’ says Mr. Loudon, ‘writes from his own experience of more than forty years, and, if we except his biblical allusions, and some vestiges of the superstition of the Roman writers about the influence of the moon, there is very little of his work which should be omitted, and not a great deal that need be added, in so far as respects the culture of corn, in a manual of husbandry adapted to the present time.’—Agriculture attained some eminence during the reign of Elizabeth. The principal writers of that period were Tusser, Googe and Sir Hugh Platt. Tusser’s *Five Hundred Points of Husbandry* was published in 1562, and conveys much useful instruction in metre. The treatise of Barnaby Googe, entitled *Whole Art of Husbandry*, was printed in 1558. Sir Hugh Platt’s work was entitled *Jewel Houses of Art and Nature*, and was printed in 1594. In the former work, says Loudon, are many valuable hints on the progress of husbandry in the early part of the reign of Elizabeth. Among other curious things, he asserts that the Spanish or Merino sheep was originally derived from England.—Several writers on agriculture appeared in England during the commonwealth, whose names, with notices of their works, may be seen in Loudon’s *Encyclopædia of Agriculture*. From the Restoration down to the middle of the eighteenth century, agriculture remained almost stationary. Immediately after that period, considerable improvement in the process of culture was introduced by Jethro Tull, a gentleman of Berkshire, who began to drill wheat and other crops about the year 1701, and whose Horse-hoeing

Husbandry was published in 1731. Though this writer's theories were in some respects erroneous, yet even his errors were of service, by exciting inquiry, and calling the attention of husbandmen to important objects. His hostility to manures, and attempting, in all cases, to substitute additional tillage in their place, were prominent defects in his system.—After the time of Tull's publication, no great alteration in British agriculture took place, till Robert Bakewell and others effected some important improvements in the breed of cattle, sheep and swine. By skilful selection at first, and constant care afterwards to breed from the best animals, Bakewell at last obtained a variety of sheep, which, for early maturity and the property of returning a great quantity of mutton for the food which they consume, as well as for the small proportion which the weight of the offal bears to the four quarters, were without precedent. Culley, Cline, Lord Somerville, Sir J. S. Sebright, Darwin, Hunt, Hunter, Young, &c. &c., have all contributed to the improvement of domestic animals, and have left little to be desired in that branch of rural economy.—Among other works on agriculture, of distinguished merit, may be mentioned the Farmer's Letters, Tour in France, Annals of Agriculture, &c. &c., by the celebrated Arthur Young; Marshall's numerous and excellent works, commencing with Minutes of Agriculture, published in 1787, and ending with his Review of the Agricultural Reports in 1816; Practical Agriculture, by Dr. R. W. Dickson, &c. &c. The writings of Kaimes, Anderson and Sinclair exhibit a union of philosophical sagacity and patient experiment, which have produced results of great importance to the British nation and to the world. To these we shall only add the name of John Loudon, F. L. S. H. S., whose elaborate Encyclopædia of Gardening and Encyclopædia of Agriculture have probably never been surpassed by any similar works in any language.—The establishment of a national Board of Agriculture was of very great service to British husbandry. Hartlib, a century before, and Lord Kaimes, in his Gentleman Farmer, had pointed out the utility of such an institution, but it was left to Sir John Sinclair to carry their ideas into execution. To

the indefatigable exertions of that worthy and eminent man the British public are indebted for an institution, whose services cannot be too highly appreciated. 'It made farmers, residing in different parts of the kingdom, acquainted with one another, and caused a rapid dissemination of knowledge amongst the whole profession. The art of agriculture was brought into fashion, old practices were amended, new ones introduced, and a degree of exertion called forth heretofore unexampled among agriculturists in this island.'—*Encyc. Am.*

AGRIMONIA. Agrimony. Nine species. Hardy. Division. Common soil.

AGROMYZA violæ. Pansy Fly. It attacks the flower by puncturing the petal, and extracting the juice; the puncture causes the colouring matter to fade. This very minute fly is shining black, bristly, eyes green, head orange. It appears in May and lives throughout the summer. Where it deposits its eggs is unknown.—*Gard. Chron.*

AGROSTEMMA. Four species. Hardy herbaceous. Division. Common soil.

AILANTUS. Two species. Hardy deciduous trees. The *glandulosa* is of rapid growth, and thrives admirably on light thin soils, where many forest trees do not succeed—it is objectionable by reason of suckering, and to many from the unpleasant odour of the flowers. Cuttings. Loamy peat.

AIR. Atmospheric air is uniformly and universally composed of

Oxygen	 21
Nitrogen	 79

Every 100 parts, even in the driest weather, containing, in solution, one part of Water; and every 1000 parts having admixed about one part of Carbonic Acid. The average proportions are

Air	 98.9
Watery Vapour	 1.0
Carbonic Acid Gas	 0.1

All these are absolutely necessary to every plant to enable it to vegetate with all the vigour of which it is capable; and on its due state of moistness depends, in a great measure, the health of any plant requiring the protection of glass. See *Leaves, Roots, Store.*

AITONIA copensis. Green-house. Cuttings. Rich mould.

AJUGA. Bugle. Eleven species. Hardy. Division or seed. Sandy peat or loam.

AKEE-TREE. *Blighia sapida*.

ALANGIUM. Two species. Stove evergreen trees. Cuttings. Sandy loam.

ALBUCA. Nineteen species. Green-house bulbs. Offsets. Sandy loam and peat.

ALBURNUM. The soft white substance which in trees is found between the liber or inner bark and the wood, and in progress of time acquiring solidity, becomes itself the wood. A new layer of wood, or rather of alburnum is added annually to the tree in every part, just under the bark.

ALCHEMILLA. Ladies' Mantle. Eleven species. Chiefly hardy. Seeds or division. Common soil.

ALCOVE, is a seat in a recess, formed of stone, brick, or other dead material, and so constructed as to shelter the party seated from the north and other colder quarters, whilst it is open in front to the south.

ALDER. *Alnus*.

ALETRIS. Two species. Hardy herbaceous plants. Offsets. Peat or leaf soil.

ALEURITES. Two species. Stove evergreen trees. Cuttings. Loamy soil.

ALEXANDRIAN LAUREL. *Ruscus Racemosus*.

ALHAGI. Manna. Two species. Green-house plants. Young cuttings or seed. Sandy loam and peat.

“**ALKALI**, in chemistry; from the Arabian *kali*, the name of a plant from the ashes of which one species of alkali can be extracted. The true alkalies have been arranged by a modern chemist in three classes:—1, those which consist of a metallic basis, combined with oxygen; these are three in number—potash, soda and lithia; 2, that which contains no oxygen, viz., ammonia; 3, those containing oxygen, hydrogen and carbon; in this class are placed aconita, atropia, brucia, cicuta, datura, delphia, hyoseyamia, morphia, strychnia. And it is supposed that the vegetable alkalies may be found to be as numerous as the vegetable acids. The original distribution of alkaline substances was into volatile and fixed, the volatile alkali being known under the name of *ammonia*; while, of the two

fixed kinds, one was called *potash* or *vegetable*, because procured from the ashes of vegetables generally; the other, *soda* or *mineral*, on account of its having been principally obtained from the incineration of marine plants.”—*Encyc. Am.* The sulphate of ammonia has been used with success as a stimulant to vegetable growth—and is now prepared and sold by chemists for that purpose.

ALLAMANDA cathartica. Stove evergreen shrub. Cuttings. Rich loamy soil.

ALLANTODIA. Five species. Green-house herbaceous plants. Division. Loamy peat.

ALLEYS are of two kinds. 1. The narrow walks which divide the compartments of the kitchen garden; and 2. Narrow walks in shrubberies and pleasure-grounds, closely bounded and overshadowed by the shrubs and trees.

ALLIONIA. Three species. Hardy annuals. Seeds. Sandy peat or loam.

ALLIUM. Garlic or onion tribe. 126 species. Hardy bulbous plants. Offsets or seed. Common soil.

ALLSEED. *Polycarpon*.

ALLSPICE. *Calycanthus*.

ALLSPICE-TREE. *Pimenta*.

ALMOND. *Amygdalus*.

ALNUS. Alder. Nineteen species. Hardy deciduous trees. Layers or seeds. Moist soil.

ALOE. Forty-seven species. Green-house evergreen shrubs. Suckers. Sandy loam and peat.

ALOMIA *Ageratoides*. Half-hardy dwarf evergreen plant. Cuttings. Sandy loam.

ALONSOA. Five species. Green-house evergreen shrubs, except *A. caudialata*, which is half-hardy. Cuttings or seeds. Rich mould.

ALOYSIA citriodora. Green-house deciduous shrub. Cuttings or seeds. Rich mould.

ALPINIA. Twenty-five species. Stove herbaceous perennials. Division. Rich sandy soil.

ALSINE. Chickweed. Six species. Hardy annuals. Seeds. Common soil.

ALSODEIA. Two species. Stove evergreen shrubs. Cuttings. Loam and peat.

ALSTONIA. Two species. Stove evergreen shrubs. Cuttings. Rich light soil.

ALSTREMERIA. Twenty-five species. The seeds should be sown im-

mediately, in sandy loam and rotten dung, and kept in a green-house, as they will not require heat. When the plants are about an inch high, they may be potted singly into very small pots, and kept in a growing state till they have formed their tubers; if suffered to die down before that period, they will never shoot again, which is the cause of many persons losing them after they have got them up from seeds. *A. aculifolia* is hardy. The seeds are sown in heat in February or March, and the young plants make their appearance in about six weeks afterwards. When strong enough, they are potted singly in sixty-pots and shifted progressively into larger sizes, as they require more room; and by autumn many of them are full four feet in height. These should be kept cool, and rather dry during winter, and then planted out against a wall, where they are finally to remain. The soil for potting them in is light sandy peat and loam: and when planted out they should be also placed in a light sandy soil, two feet deep, on a perfectly dry bottom.

ALTERNANTHERA. Twelve species. Stove herbaceous; except *A. frutescens*, which is a green-house evergreen. Cuttings. Light rich soil.

ALTHÆA. Marsh mallow. Seventeen species. Hardy plants. Division or seed. Common soil.

ALTINGIA. Two species. Green-house evergreen trees. Cuttings and seeds. Deep loamy soil.

ALTITUDE, or elevation above the sea, has a great influence over a plant's vegetation. The greater that altitude the greater the reduction of temperature, so much so that every 600 feet of altitude are believed to reduce the annual temperature as much as receding a degree from the equator, either to the north or to the south. But this rule is far from universally applicable, for the limit of perpetual snow at the equator is at the height of 15,000 feet, whereas in the 35th degree of north latitude, the limit is at 11,000 feet, being an average of about 120 feet of altitude for every degree of recession from the equator. In the 45th degree, the limit is 8,400 feet, being an average of 146 feet for every degree; in the 50th degree, 6,000 feet, or 180 feet for each degree; in the 60th, 3,000 feet, or 200 feet for a degree; and in the 70th, from 1,200 to

2,000 feet, or about the same for each degree as to the 60th degree of latitude. Now I know of no reason why the temperature of elevations below the snow line should not follow the same gradations; and if this be so, these may be taken as a rule. All plants growing above 7,000 feet under the equator, ought to grow in the open air, in the latitude of London. In general, the same vegetation is produced at the same distance from the snow line in the same latitudes; though, when a place is very near to the pole, a better vegetation is produced in a short period of summer than in places near the snow line under the equator, the plants in the former being there exposed to uninterrupted sunlight.

"At the foot of Mount Ararat, Tournefort met with plants peculiar to Armenia; above these he met with plants which are found also in France; at a still greater height he found himself surrounded with such as grow in Sweden, and at the summit, with such as vegetate in the polar regions. Baron Humboldt, in his Personal Narrative, gives us a similar account of the several zones of vegetation existing in a height of 3,730 yards on the ascent of Mount Teneriffe. The first zone is the region of vines, extending from the shores of the ocean to a height of from 400 to 600 yards, well cultivated, and producing date trees, plantains, olives, vines, and wheat. The second zone is the region of laurels, extending from about 600 to 1,800 yards, producing many plants with showy flowers, and moss and grass beneath. The third zone is the region of pines, commencing at 1,920 yards, and having a breadth of 850 yards. The fourth zone is the region of Retama, or broom, growing to a height of nine or ten feet, and fed on by wild goats. The last zone is the region of grasses, scantily covering the heaps of lava, with cryptogamic plants intermixed, and the summit of the mountain bare."—*Farmer's Encyclop.*

"Of perfect plants, the *Daphne Cneorum* seems in Europe to hold the most elevated station, since, on Mont Blanc, it stands at 10,680 feet, and on Mont Perdu at 9,036 feet high. The growth of woody plants ceases on the Alps of central Europe at the height of 5,000 feet; and on the Riesengebirge at 3,800. Oats grow on the southern Alps at

3,300, and on the northern, scarcely at 1,800 feet. The fir grows on Sulitelma, in Lapland (68 degrees north latitude), scarcely at the height of 1,200 feet. On the other hand, upon the Alps which divide Italy from France and Switzerland, oaks and birches grow at 3,600; firs at 4,800; and the same plants grow on the Pyrenees above the height of 600 feet. In Mexico, the mountain chains, and in particular the Nevado of Toluca, are covered, above 12,000 feet high, with the occidental pine (*Pinus occidentalis*), and above 9,000 feet, with the Mexican oak (*Quercus Mexicana spicata*), as also with the alder, of Jorullo (*Alnus Jorullensis*). On the Andes, palms grow at the height of 3,000 feet. The woody ferns (*Cyathea speciosa*, *Menisium arborescens*, *Aspidium rostratum*) are found as high as 6,600 feet; as are also the pepper species, *Melastomæ*, *Cinchonæ*, *Dorsteniæ*; and some *Scitamineæ* rise to the same elevation. At the height of 14,760 feet, we still find the wax palms, some *Cinchonæ*, *Winteræ*, *Escallomæ*, *Espelettia*, *Culcitia*, *Joanneæ*, *Vallea stipularis*, *Bolax aretioides*, and some others." — *De Candolle's Philos. of Plants*.

ALYSICARPUS. Two species. Stove herbaceous perennials. Seeds, and root division. Rich light soil.

ALYSSUM. Twenty-one species. All hardy plants. Seeds, cuttings, and division. Common soil.

ALYXIA. Five species. Green-house evergreen shrubs. Cuttings. Sandy loam.

ALZATEA verticillata. Green-house evergreen tree. Root cuttings. Sandy loam and peat.

AMARANTHUS. Eighteen species. Hardy annuals. Seed. Rich garden soil.

AMARYLLIS. Seventy-six species, and many varieties. *A. aulica* and *bel-ladonna* are hardy; the others, a few green-house, but mostly hot-house bulbs.

A. (Vallota) purpurea. "Pot in good-sized pots, in a mixture of loam, sandy peat, and leafmould, being merely kept in a green-house, with but little water through the winter, and about May set in the open air in pans of water, under a south wall, where about June or July they throw up their splendid scarlet flowers, which last fully a week or more. They would be very orna-

mental plunged at the side of a warm sandy pond, forming a good contrast with *Crinum*, *capense*, *Nymphaea alba*, &c. About October they are removed into winter quarters, increase pretty fast by offsets, taken off and fresh potted in April, and treated as the parent bulbs, which should at that time have their decayed outer skin removed." — *Gard. Chron.*

AMBURY is a disease peculiar to the Brassica tribe, and is known by the various names of *Hanbury*, *Anbury*, and *Club Root*. *Fingers and Toes*, a name applied to it in some parts, alludes to the swollen state of the small roots of the affected plants.

Cabbage plants are frequently infected with ambury in the seed-bed, and this incipient infection appears in the form of a gall or wart upon the stem immediately in the vicinity of the roots. If this wart is opened, it will be found to contain a small white maggot, the larva of a little insect called the weevil. If the gall and its tenant being removed, the plant is placed again in the earth, where it is to remain, unless it is again attacked, the wound usually heals, and the growth is little retarded. On the other hand, if the gall is left undisturbed, the maggot continues to feed upon the albumum, or young woody part of the stem, until the period arrives for its passing into the other insect form, previously to which it gnaws its way out through the exterior bark. The disease is now almost beyond the power of remedies. The gall, increased in size, encircles the whole stem; the albumum being so extensively destroyed, prevents the sap ascending, consequently, in dry weather, sufficient moisture is not supplied from the roots to counterbalance the transpiration of the leaves, and the diseased plant is very discernible among its healthy companions by its pallid hue and flagging foliage. The disease now makes rapid progress, the swelling continues to increase, for the vessels of the albumum and the bark continue to afford their juices faster than they can be conveyed away; moisture and air are admitted to the interior of the excrecence, through the perforation made by the maggot; the wounded vessels ulcerate, putrefaction supervenes, and death concludes the stunted existence of the miserable plant. The tumour

usually attains the size of a large hen's egg, has a rugged, ichorous, and even mouldy surface, smelling strong and offensively. The fibrous roots, besides being generally thickened, are distorted and monstrous from swellings, which appear throughout their length, apparently arising from an effort of nature to form receptacles for the sap, deprived as it is of its natural spissation in the leaves. These swellings do not seem to arise immediately from the attacks of the weevil, for I have never observed them containing its larva.

Mr. Marshall very correctly describes the form which this disease assumes when it attacks the turnip. It is a large excrescence appearing below the bulb, growing to the size of both hands, and, as soon as the hard weather sets in, or it is, by its own nature, brought to maturity, becoming putrid and smelling very offensively.

These distortions manifest themselves very early in the turnip's growth, even before the rough leaf is much developed. Observation seems to have ascertained, that if the bulbs have attained the size of a walnut unaffected, they do not subsequently become diseased. The maggot found in the turnip ambury is the larva of a weevil called *Curculio pleurostigma*. "I have bred this species of weevil," says Mr. Kirby, "from the knob-like galls on turnips called the ambury, and I have little doubt that the same insects, or a species allied to them, cause the clubbing of the roots of cabbages."

Marshall describes the parent as a coleopterous insect of a dusky black colour, with the breast spotted with white, and the length of the body one line and two-thirds. The general experience of all the farmers and gardeners with whom I have conversed upon the subject, testifies that the ambury of the turnip and cabbage usually attacks these crops when grown for successive years on the same soil. This is precisely what might be expected, for where the parent insect always deposits her eggs, some of these embryo ravagers are to be expected. That they never attack the plants upon a fresh site is not asserted; Mr. Marshall's statement is evidence to the contrary; but it is advanced that the obnoxious weevil is most frequently to be observed in soils where the turnip or cabbage has recently and repeatedly been cultivated.

Another general result of experience is, that the ambury is most frequently observed in dry seasons. This is also what might be anticipated, for insects that inhabit the earth just beneath its surface, are always restricted and checked in their movements by its abounding in moisture. Moreover, the plants actually affected by the ambury, are more able to contend against the injury inflicted by the larva of the weevil, by the same copious supply.

In wet seasons, I have, in a very few instances, known an infected cabbage plant produce fresh healthy roots above the swelling of the ambury. Mr. Smith, gardener to M. Bell, Esq., of Woosington, in Northumberland, expresses his conviction, after several years' experience, that charcoal-dust spread about half an inch deep upon the surface, and just mixed with it by the point of a spade, effectually prevents the occurrence of this disease. That this would be the case we might have surmised from analogy, for charcoal-dust is offensive to many insects, and is one of the most powerful preventives of putrefaction known. Soot, I have reason to believe, from a slight experience, is as effectual as charcoal-dust. Judging from theoretical reasons, we might conclude that it would be more specific; for, in addition to its being, like charcoal, finely divided carbon, it contains sulphur, to which insects also have an antipathy.

I have a strong opinion that a slight dressing of the surface soil with a little of the dry hydro-sulphuret of lime, that may now be obtained so readily from the gas-works, would prevent the occurrence of the disease by driving the weevils from the soil. It would probably as effectually banish the turnip fly or flea, if sprinkled over the surface immediately after the seed is sown. I entertain this opinion of its efficacy in preventing the occurrence of the ambury, from an instance when it was applied to some brocoli, ignorantly endeavoured to be produced in successive crops on the same plot. These had invariably failed from the occurrence of the ambury, but the brocoli was now uninfected. The only cause for this escape that I could trace was, that, just previously to planting, a little of the hydro-sulphuret of lime had been dug in. This is a very fetid powerful com-

pound. Where dry lime purifiers are employed at gas works, it may be obtained in the state of a dry powder, but where a liquid mixture of lime and water is employed, the hydro-sulphuret can only be had in the form of a thick cream. Of the dry hydro-sulphuret I would recommend eight bushels per acre to be spread regularly by hand upon the surface after the turnip seed is sown, and before harrowing. If the liquid is employed, I would recommend thirty gallons of it to be mixed with a sufficient quantity of earth or ashes, to enable it to be spread over an acre in a similar manner. For cabbages, twelve bushels, or forty-five gallons per acre, would not probably be too much, spread upon the surface and turned in with the spade or last ploughing. To effect the banishment of the turnip-flea I should like a trial to be made of six or eight bushels of the dry, or from twenty-two to twenty-eight gallons of the liquid, hydro-sulphuret being spread over the surface immediately after the sowing, harrowing, and rolling are finished. Although I specify these quantities as those I calculate most correct, yet in all experiments it is best to try various proportions. Three or four bushels may be found sufficient, perhaps twelve, or even twenty, may not be too much. In cabbages the ambury may usually be avoided by frequent transplantings, for this enables the workman to remove the excrescences upon their first appearance, and renders the plants altogether more robust and ligneous; the plant in its tender sappy stage of growth being most open to the insect's attacks. The warts or galls that so frequently may be noticed on the bulbs of turnips, must not be mistaken for the ambury in a mitigated form. If these are opened, they will usually be found to contain a yellowish maggot, the larva probably of some species of cynips. This insect deposits its eggs in the turnip when of larger growth than that at which it is attacked by the weevil, and the vegetable consequently suffers less from the injury; but from some slight observations, I am inclined to conclude, that the turnips thus infested suffer most from the frosts of winter, and are the earliest in decay.—*Johnson's Principles of Gardening.*

The Ambury occasionally exhibits itself around Philadelphia, principally in

small gardens, where the same crop is too frequently repeated: also in market gardens. In the latter case it may be attributable to the putrid manure used to produce excessive luxuriance. Lime, change of manure, rotation of crops, but above all deep tillage, bringing the subsoil to the surface, are the remedies adopted.

AMELANCHIER. Four species. Hardy deciduous shrubs. Layers. Common moist soil.

AMELLUS. Three species. *A. Lychitis*, green-house evergreen; others hardy and deciduous. Cuttings. Loam.

AMERICAN ALOE. *Agave Americana*.

AMERICAN COWSLIP. *Dodecatheon*.

AMERICAN BLIGHT, (*Aphis lanigera*—*Eriosoma lanigera*.) The cottony matter in the cracks and excrescences of apple tree branches in the spring envelops an insect known by the above names, and which, when crushed, exudes a reddish fluid. These insects are injurious by piercing the sap vessels with their probosces, sucking the juice of the tree, and causing wounds which ulcerate and finally destroy the branch attacked by corroding through all the sap vessels. The cottony matter is abundant, and, wafted to other trees, probably conveys to them infection, by bearing with it the eggs or embryo insect. But this is not the exclusive mode of diffusing the disease, for although the females are usually wingless, yet, like many other insects, some are probably produced with wings at the season propitious to colonization. The males are uniformly winged. In the winter these insects retire under ground, and prey upon the roots of the apple tree. A tree thus ravaged at all seasons will soon be killed, if prompt and vigorous remedies are not adopted. The affected roots may be bared and left exposed for a few days to the cold, and the earth, before being returned, be saturated with ammoniacal liquor from the gas works. In early March the branches should be scraped, and scrubbed with the same ammoniacal liquid, or a strong brine of common salt; but whatever liquid is employed, the scraping and hard bristles of the brush should penetrate every crack in the

bark. This treatment, repeated and persevered in so long as the least appearance of the insect is observed, never fails of a cure. Linseed or rape oil or spirit of tar applied to the infected part, and repeated a second or third time with a brush, are also effective remedies. They suffocate the insects. Strong pyroligneous acid applied in the same mode is also said to destroy this as well as the scale insect. The codlin and June eating, are particularly liable to be infected; but I never observed it upon any of the russet apples: and the Crofton pippin is also said to be exempted.

AMERICAN CRANBERRY, (*Oxycoccus macrocarpa*.)

Soil.—A light soil, well incorporated with peat, and occasionally manured with rotten leaves.

Situation.—It requires a constant supply of water, and on a south bank where this supply can be obtained, it may be planted in rows four feet apart each way, and the water made to circulate in a small ditch between the rows. But the edge of a pond will suit it almost as well.

After-culture.—The shrubs require no other attention than to be kept free from weeds.

Produce.—This is so abundant that a bed six yards long is sufficient for the largest family.

AMERICAN CRESS, (*Barbarea precoc.*)

Soil and Situation.—For the winter standing crops, a light, dry soil, in an open but warm situation, should be allotted to it; and for the summer, a rather moister and shady border is to be preferred. In neither instance is it required to be rich.

Time and mode of sowing.—It is propagated by seed, which must be sown every six weeks from March to August for summer and autumn, but only one sowing is necessary either at the end of August or beginning of September, for a supply during winter and spring. It may be sown broadcast, but the most preferable mode is in drills nine inches apart. Water may be given occasionally during dry weather, both before and after the appearance of the plants. If raised from broadcast sowings, the plants are thinned to six inches apart; if in drills, only to three. In winter they require the shelter of a little litter, or other light covering; and to pre-

vent them being injured by its pressure, some twigs may be bent over the bed, or some light bushy branches laid among them, which will support it. The only cultivation they require is to be kept clear of weeds.

In gathering, the outside leaves only should be stripped off, which enables successive crops to become rapidly fit for use.

When the plants begin to run, their centres must be cut away, which causes them to shoot afresh.

To obtain Seed.—For the production of seed, a few of the strongest plants, raised from the first spring sowing, are left ungathered from. They flower in June or July, and perfect their seed before the commencement of autumn.

AMERICAN PLANTS. In England and the European continental gardens, apartments are allotted to collections of our native plants, and usually denominated the *American department*. It is somewhat amusing to read the directions laid down as to its soil, situation, &c., as if our country, which presents the greatest diversity of soil, climate and altitude, with corresponding vegetable productions, some delighting in the swamp, others in the mountain, some sustaining the frosts of high northern latitudes, others luxuriating in the sunny south, each choosing for itself its own peculiar soil!—were as bounded and contracted as the British Isle. We annex a specimen. "*American Plants*. These comprise many very different species, which, resembling each other in requiring a peaty soil and abundance of water, are usually cultivated in a separate department, where the garden establishment is extensive; and, wherever grown, should have a compartment to themselves, a very acutely sloping bank, facing the north or east; and some of them, as the Rhododendron, Andromeda, and Azalea, do not object to being overshadowed by trees. The soil, as already stated, must be peat; and the best annual dressings that can be applied are such matters as decayed leaves, and the bottom of old wood stacks; or any other mixture of decayed woody fibre."

AMERIMNUM. Two species. Stove evergreen shrubs. Cuttings. Loam.

AMETHYSTIA carulea. Hardy annual. Seed. Peat.

AMHERSTIA nobilis. Stove ever-

green. A most lovely tree. Cuttings. Rich clayey loam.

AMICIA *zigomeris*. Stove evergreen climber. Cuttings. Loam.

AMIROLA *nitida*. Stove evergreen tree. Cuttings. Peat and loam.

AMMOBIUM. Two species. Half-hardy herbaceous. Cuttings. Peat and sand.

AMMOCHARIS. *Brunsvigia*.

AMMYRSINE. Two species. Hardy evergreen shrubs. Layers. Sand and peat.

AMOMUM. Thirteen species. Stove herbaceous perennials. Division. Light rich soil.

AMORPIA. Eleven species. Chiefly hardy deciduous shrubs. Layers and cuttings. Common light soil.

AMPELOPSIS. Four species. Hardy deciduous climbers, except *A. bipinnata*, which is a shrub. Layers or cuttings. Common soil.

AMPELYGONUM *chinense*. Green-house herbaceous. Seed. Sand, loam; and peat.

AMPHEREPHIS. Three species. Hardy annuals. Seed. Common soil.

AMPHICARPA. Two species. Hardy deciduous twiners. Seed or cuttings. Loam, peat and sand.

AMPHICOME *arguta*. Half-hardy evergreen. Seeds or cuttings. Loam, sand, and peat. Suited for rock-work.

AMPHILOBIUM *paniculatum*. Stove evergreen climber. Cuttings. Loam and peat.

AMSONIA. Three species. Hardy herbaceous. Cuttings or division. Common soil.

AMYGDALUS. Almond. Six species, and many varieties. Seed and grafts. Rich loam. For culture, see PEACH.

AMYRIS. Ten species. Stove evergreen trees. Cuttings. Loam and peat.

ANACAMPSEROS. Ten species. Green-house evergreen shrubs. Suckers. Common light soil.

ANACARDIUM. Two species. Stove evergreen trees. Cuttings. Light loam.

ANACYCLUS. Three species. Hardy annuals. Seed. Common soil.

ANADENIA *pulchella*. Green-house evergreen shrub. Cuttings. Peat and loam.

ANAGALLIS. Pimpernel. Ten species. Some are hardy annuals—seed; others green-house biennials;

these and the perennial species are propagated by cuttings. Common light soil suits all.

ANAGYRIS. Three species. Half-hardy evergreen shrubs. Cuttings or seed. Rich light soil.

ANANASSA. Pine Apple. Four species and many varieties. See PINE-APPLE.

ANANTHERIX *viridis*. Hardy perennial. Seed or division. Light rich soil.

ANARRHINUM. Three species. Hardy biennials. Seed. Common soil.

ANASTATICA *hierochuntina*. Rose of Jericho. Half-hardy annual. Seed. Common soil.

ANCHIETEA *pyrifolia*. Stove evergreen climber. Peat and loam.

ANCHOVY-PEAR. *Grias cauliflora*.

ANCHUSA. Twenty-seven species. All hardy but *A. capensis*. This requires to be raised in a frame; the others may be sown in open borders.

ANDERSONIA *sprengeloides*. Green-house evergreen shrub. Cuttings. Sandy peat.

ANDIRA. Two species. Stove evergreen trees. Cuttings. Loam and peat.

ANDROCYMBIUM. Three species. Green-house bulbs. Offsets. Peat and sandy loam.

ANDROMEDA. Twenty-nine species and many varieties. Mostly hardy evergreens. *A. buxifolia*, *fasciculata*, *jamaicensis*, and *rubiginosa* are stove evergreens. *A. hypnoides*, *japonica*, *ovalifolia*, *sinensis*, and *tetragona* are half-hardy. The United States has contributed the larger portion of this interesting genus. Seed. Peat.

ANDROSACE. Eighteen species. Mostly hardy. Seed or division. Peat and turf loam.

ANDRYALA. Nine species. Some hardy, others green-house plants. Seed and division. Common soil.

ANEILEMA. Eleven species. Stove and green-house. Division or seed. Peat and sandy loam.

ANEMIA. Eleven species. Stove ferns. Division and seed. Light loam.

ANEMONE. Wind-flower. Forty-seven species; numerous varieties. Some hardy herbaceous, others hardy tuberous; *A. vitifolia* is half-hardy, and *A. capensis* green-house. *A. thalictroides flore pleno* is a very beautiful and chaste flower, an artificial product from

a well known American species. Division, offsets, or seeds. Light loam.

The anemone, the florist's flower of our gardens, is the offspring of the *A. coronaria* (poppy anemone), and *A. hortensis* (star-leaved anemone). Sprung from these there are now about eighty varieties in our catalogues. A variety lasts about twelve years. The following is a good selection.

Agnita.	Regina Rubrorum.
Belle Hortense.	Reine Caudale.
Bellona.	— des Fleurs.
Coeur de Sang.	— of Anemones.
Court de France.	Remarkable.
Cramoisie Superbe.	Rosalia.
Grand Duke.	Rose Agreeable.
High Admirable.	— Jolie.
Imperatrice.	— Mernette.
Incomparable A-	— Parfaite.
zure.	— Surpassante.
Olympia.	Superbe Royale.
Regina Augusta.	Triumphante.

Characteristics of a good anemone.—The stem should be strong, elastic, and erect, not less than nine inches high. The blossom or corolla should be at least two inches and a half in diameter, consisting of an exterior row of large substantial well-rounded petals or guard-leaves, at first horizontally extended, and then turning a little upwards, so as to form a broad shallow cup, the interior part of which should contain a great number of long small petals imbricating each other, and rather reverting from the centre of the blossom: there are a great number of small slender stamens intermixed with these petals, but they are short and not easily discernible. The colour should be clear and distinct when diversified in the same flower, or brilliant and striking if it consists only of one colour, as blue, crimson, or scarlet, &c., in which case the bottom of the broad exterior petals is generally white; but the beauty and contrast are considerably increased when both the exterior petals are regularly marked with alternate blue and white, or pink and white, &c., stripes, which, in the broad petals, should not extend quite to the margin.

Propagation.—All the varieties are propagated by offsets from the root, and new varieties are obtained from seed.

By offsets all the kinds increase exceedingly every year, so the roots of all the best kinds should be taken up

annually at the decay of the leaf, and the root may be divided or broken into as many pieces or knobs as are furnished with an eye or bud, observing, however, that if they are divided very small, they flower very weak the first year; therefore, if you would have strong flowers from the main root, only break off those small ones that are slightly affixed thereto, but they should not be thus divided until autumn, or near the time for planting them again.

The time for taking up the roots is in May and June, when the leaf and stalk are withered, for then the roots cease to grow for a month or six weeks; but if they are permitted to stand to put forth fresh fibres again, they should not be removed that season.

They should be taken up in dry weather, and spread in an airy place out of the sun for about a week, then cleared from earth and put up in bags or boxes till the planting season arrive.

The seed should be sowed from the best single or semi-double flowers; the full doubles afford none.

The time to sow it is March, either in boxes, large pots, or pans, of light compost, or in a bed of such earth; sow it moderately thick, and cover it near a quarter of an inch deep with sifted mould. From this time occasional shade and moderate waterings in dry weather are necessary, and in six weeks the plants will appear. Keep them clear from weeds, and when the leaves decay, sift a quarter of an inch of earth over the bed, which is all that is necessary till the second summer, when they are to be taken up at the decay of the leaf, and managed as the old roots in the manner already directed.

Time for planting.—The best time to plant the principal sorts for the general bloom is October, or early in November, and the plants will come into flower in April and beginning of May; but if some are planted in the middle of September, and a second parcel towards the middle or latter end of October, they will afford a succession of bloom from the beginning of April until the middle of May; and if a third plantation is made in February or beginning of March, they will come into flower about the middle of May, and continue until the middle of June.

Those planted early in autumn come up before Christmas, and always pro-

duce the largest flowers, and continue in beauty; the roots too afford a larger increase than those planted in spring.

Soil and site.—The situation proper for the anemone should be thoroughly drained, and open to the south, and unincumbered by the shade of trees. The anemone will prosper and flower in tolerable perfection in any common moderately light earth, only observing to avoid planting in overmoist and stiff soils, which rot the roots in winter; and if any addition is necessary to raise or form the beds, no more is needful than common light soil from the quarters of the kitchen garden, or any other well-wrought garden earth, working the whole one good spade deep. The beds, however, are often formed of composts. Take maiden loam from the surface of a pasture, the top spit turf and all; to every load of this add one of neats' dung, and half a load of sea or drift sand; blend the whole together, and form it in a ridge, in which let it remain a year at least, turning it over once in two or three months.

But in default of pasture earth, a good compost may be formed of common light garden soil and rotted neats' dung, adding to every load of the former half a load of the latter, and about a quarter of that of drift or sea sand; and of either of which composts the bed is to be formed, about twelve or fifteen inches in depth, and three feet and a half broad.

Planting.—In the borders, plant them in patches three, four, or five roots together, in a patch of five or six inches breadth, putting them two or three inches deep.

Beds.—Mark out three feet and a half broad, the length according to the number of plants, with alleys eighteen inches wide between bed and bed. The beds must be worked fifteen or eighteen inches deep; break the earth small, but do not sift it, observing that to prevent lodgment of wet, and to give the beds a good appearance, as well as to show the flowers to the best advantage, it is eligible to elevate them three inches above the common level or general surface, but if there is danger of moisture standing in winter, double or treble that is a proper height, working the whole a little rounding and raking the surface smooth.

In each bed plant six rows lengthwise, the roots at six inches distance in each

row, and two inches deep, and when one bed is planted, run over it lightly with the rake.

Those of the autumn plantation will come up in leaf in November, but as the plants are hardy, nothing is needful to be done till the bloom begins to appear; and then, if you think proper to bestow a little care upon the superior sorts, by arching the beds with hoops, in order to cover the bloom with mats occasionally, to protect it from cutting black frosts, which often prevail in April.

Protection.—An easy way of protecting Anemones and Ranunculuses is to bend across the beds wooden or iron hoops, securely fixed in the ground; upon these mats can be thrown in cases of frost or snow, but care must be taken that they are firmly secured to the hoops by pegs.—*Gard. Chron.*

* *Forcing.*—“Double Anemones may be potted in October, and the soil should be composed as follows:—One-half maiden loam, fresh from the pasture, with one-quarter well-rotted cow dung, and one-quarter fine sand (sea or river sand if possible). After potting, they may be placed in a cold frame or pit, and watered but sparingly until the following spring, when they may be put into a warmer place. They will not stand much forcing by artificial means.”—*Gard. Chron.*

Mildew.—This disease first appears as pale spots on the under sides of the leaves. These spots gradually rise into tubercles, and a minute fungus bursts through, shedding its seed, and diffusing the disease. This parasitical fungus is *Aecidium quadrifidum*. Sea sand, or a little salt mixed with the compost of the bed, is a good preventive; and a syringing with very diluted gas-water, is a good application after infection.

ANETHUM. Four species. All hardy, including FENNEL and DILL, which see.

ANGELICA, (*Angelica Archangelica*.) Stalks cut in May, for candying. Formerly blanched and eaten like celery.

Soil and Situation.—It may be grown in any soil and exposure, but best in moist situations, consequently the banks of ponds, ditches, &c., are usually allotted to it.

Time of Sowing.—Sow soon after the seed is ripe, about September, being

almost useless if preserved until the spring; if, however, neglected until that season, the earlier it is inserted the better.

Mode of Cultivation.—Sow moderately thin, in drills a foot asunder, and half an inch deep. When arrived at a height of five or six inches, the plants must be thinned, and those removed transplanted, to a distance of at least two feet and a half from each other, either in a bed, or on the sides of ditches, &c. Water in abundance must be given at the time of removal, as well as until they are established; but it is better to discontinue it during their further growth, unless the application is regular and frequent. In the May, or early June of the second year, they flower, when they must be cut down, which causes them to sprout again, and if this is carefully attended to, they will continue for three or four years; but if permitted to run to seed, they perish soon after.

Seed.—A little seed should be saved annually, as a resource in case of any accidental destruction of the crop.

ANGELICA-TREE, *Aralia spinosa*.

ANGEONIA *salicariaefolia*. Stove herbaceous. Cuttings. Sandy rich loam.

ANGIANTHUS *aureus*. Green-house herbaceous. Division. Loam and peat.

ANGLE-SHADES MOTH. See *Phlogophora*.

ANGIOPHORA. Two species. Green-house evergreen shrubs. Cuttings. Peat, sand, and loam.

ANGRÆCUM. Nine species. Stove epiphytes. Cuttings. Wood, or moss and potsherds, in baskets.

ANGUILLARIA. Three species. Half-hardy herbaceous. Offsets. Sandy peat.

ANGURIA. Four species. Stove evergreen climbers. Division. Loam and peat.

ANIA *bicornis*. Stove epiphyte. Offsets. Peat and potsherds.

ANIGOZANTHOS. Three species. Green-house herbaceous. Division. Sandy peat.

ANIMAL MATTERS, without any exception, are beneficial as manures, for they all yield during putrefaction gases and soluble substances that are imbibed greedily by the roots of plants. That this is the case affords no cause for wonder, because animal matters and vegetable matters are alike compounded of

carbon, hydrogen, oxygen, and nitrogen, with a small addition of saline matters. The general consideration of *Manures* will be found under that title, and other relative information under the heads DUNG and VEGETABLE MATTERS, and in this place I shall confine my attention to some of the most available of strictly animal matters. See also the article *Bones*.

Blubber, or fat of the whale, contains train oil, composed of

Carbon 68.87

Hydrogen 16.10

Oxygen 15.03

with a little animal skin and muscle. Forty gallons of train oil, mixed with 120 bushels of screened soil, grew twenty-three tons of turnips per acre, on a soil where forty bushels of bones broken small, and eighty bushels of burnt earth, produced only twenty-one tons.

Fish generally, such as sprats, herrings, pilchards, five-fingers, and shell-fish, owe their powerful fertilizing qualities not only to the oil they contain, but also to the phosphate of lime in their bones. From twenty-five to forty-five bushels per acre are the extreme quantities to be applied broad-cast, but if in the drills, with the crop sixteen bushels are ample. They are beneficial to all the gardener's crops, but especially to asparagus, parsnips, carrots, beets, onions, and beans. Shell-fish should be broken before being applied.

Blood is a very rich manure, and has been used with especial benefit to vines, and other fruit trees. The blood of the ox contains about eighty per cent. of water, and twenty per cent. solid matter. The latter contains in 100 parts when dried,

Carbon 51.950

Hydrogen 7.165

Azote 17.172

Oxygen 19.295

Ashes 4.418

The ashes contain various salts, as chloride of sodium, (common salt,) phosphate of lime, with a little oxide of iron. *Sugar-baker's skimmings* owe their chief fertilizing qualities to the blood used in clarifying the sugar, and which is combined with vegetable albumen and extractive.

Woollen Rags, cut into very small pieces, are a good manure, decomposing slowly, and benefiting the second as

much as the first crop. Hops and turnips have been the crops to which they have been chiefly applied. Half a ton per acre is a fair dressing. Wool is composed of

Carbon	50.653
Hydrogen . . .	7.029
Azote	17.710
Oxygen }	
Sulphur }	24.608

It leaves a very slight ash, containing minute quantities of muriate of potash, lime, and probably phosphate of lime. *Feathers* and *hair* closely resemble it in their components. *Horns* are composed of

Carbon	51.578
Hydrogen . . .	6.712
Azote	17.284
Oxygen }	
Sulphur }	24.426

besides minute proportions of sulphate, muriate and phosphate of potash, phosphate of lime, and other less important matters.

Shells.—Those of the following fish are thus composed:—

	Phosphate of Lime.	Carbonate of Lime.	Animal matter.
Oyster . .	1.2	98.3	0.5
Lobster . .	7.0	63.0	30.0
Hen's Eggs	5.7	89.6	4.7

They have all been found good in a pounded form, as manures for turnips; and must be for all other plants, and on all soils where calcareous matters are deficient. For more extensive notices of these and similar manures, the reader is referred to a useful work, recently published in this country, "The Economy of Waste Manures."

ANISACANTHA divaricata. Green-house evergreen shrub. Cuttings. Peat and loam.

ANISANTHUS. Three species. Green-house bulbs. Offsets. Sandy soil.

ANISE, (*Tragium anisum*.) Half-hardy annual, used for garnishing or seasoning. Sow during April in pots plunged in a hotbed; remove to a warm, light border in May. Thin the plants to six inches apart. The seed is ripe in August or September. It does not bear transplanting.

ANISEED-TREE, *Illicium anisatum*.

ANISOCHILUS carnosa. Stove herbaceous. Cuttings. Rich light soil.

ANISOMELES. Four species. Three are stove evergreens, and *A. ovata*, a

stove annual. Division or seed. Light dry soil.

ANISOPIA horticola, is a beetle which often attacks the rose flowers about June. Its maggots live under turf, and feed on its roots.

ANNUALS, are plants which live but one year, and, consequently, require to be raised from seed annually. By a particular mode of culture some of them may be made to live longer. Thus *mignonette* will continue to bloom for two or more years if not allowed to ripen its seeds.

Hardy Annuals are sown where they are to remain in the open borders, in March or April, as the latitude and temperature may make expedient, of which the cultivator can readily judge; it is usually safe to sow them when the peach expands its blossoms. Whether sown in patches or broad masses, whether mixed or separate, must be left to the taste of the sower—guided by his knowledge of the colours of the flowers. These should be well contrasted. No one but an ignoramus would have many sorts of the same colour together. Every patch should be properly labelled, which is easily done by having some deal laths, one inch broad, planed smooth, cut into nine-inch lengths, and painted white. On these the names can be written with a lead pencil.

Dr. Lindley truly observes, that "It is possible to maintain a garden in a state of the greatest beauty from the first visit of spring to the last fading ray of autumn sunshine, by the simple practice of growing annuals and other plants of a similar nature in pots. And for this purpose an ample variety may be had for three-pence a seed-paper, without having recourse to any means more costly.

"Not that the common method of growing plants in pots will answer this end; on the contrary, managed as they usually are, annuals, in pots, are the most miserable objects in the garden, for the pots become so dry, from the continual evaporation of water, through their porous sides, that the plants are literally starved.

"The method to pursue in preparing pots for receiving annuals, is this:—in the first place, lay a crock over the hole in the bottom of the pot, then fill the pot to about one-third or one-half of its depth with wet moss pressed very close,

and over that put rich light soil, in which the annual seeds are to be sown, or young plants are to be pricked out. The pot is then placed in a common pan, and the latter is filled with water in wet weather. The moss absorbs the water freely, and parts with it slowly; at the same time it forms a mass of moist materials, in which the roots of a plant will freely spread. By these simple means, the annuals are completely guarded from all the evils of dryness, and they grow with the same health, though not to the same size, perhaps, as if planted out in the open border. Such pots can be distributed over the garden, wherever a vacancy occurs, and will decorate the borders beneath trees and bushes, where no such plants will grow in the open ground itself. Their sides are rapidly covered with their own lower branches, or may be concealed by the foliage of each other: as soon as one is shabby, it is removed, and succeeded by another in full beauty; and, by a little management, chiefly consisting in repeated sowings at short intervals, no interruption to the succession of flowers need be experienced. Another advantage of this plan consists in the facility with which the arrangement of colours and grouping of individuals can be effected and varied.

“Bulbs may be treated in the same manner, and then will never be destroyed by the careless spade of the garden labourer. The only point to observe is, that each pot should rarely contain more than a single plant, unless in the case of species of very small size naturally, or of bulbous plants.”—*Gard. Chron.*

The following is a good selection, and may be obtained at most seed stores. It should, however, be observed, in justice to seedsmen, that as the seeds of many annuals are extremely minute and delicate, so is the difficulty of causing them to vegetate increased, especially in seasons of too much or too little moisture, and due allowance should be made therefor.

HARDY ANNUALS.

Bartonia aurea.
Calandrinia discolor.
 ——— (Talinum) *speciosa.*
Callichroa platyglossa.
Campanula Lorei.
Chrysanthemum carinatum.
Clarkia pulchella.

Clintonia pulchella.
Collinsia bicolor.
 ——— *grandiflora.*
Collomia coccinea.
Convolvulus tricolor.
Coreopsis (Calliopsis) atro purpurea.
Emilia (Cacalia) coccinea.
Erysimum Perofskianum.
Eutoca viscida.
Gilia tricolor.
Godetia Lindleyana.
 ——— (Enothera) *rubicunda.*
 ——— *tenuifolia.*
Hibiscus Africanus.
Kaulfussia (Amellus) amelloides.
Leptosiphon androsaceus.
 ——— *densiflorus.*
Lupinus Hartwegii.
 ——— *nanus.*
Malope grandiflora.
Nemophila atomaria.
 ——— *insignis.*
Nolana atriplicifolia.
(Enothera) tetraptera.
Phlox Drummondii.
Platystemon californicum.
Schizopetalum Walkeri.
Sphenogyne speciosa.
Viscaria (Agrostemma) cœli-rosa.

HALF-HARDY ANNUALS

Are sown in a gentle hot-bed early in April, or late in March, then to be transplanted into the borders, and attended like other annuals. These specifications as to time, apply to the middle states, and may also serve to guide those north or south. The tender annuals may generally be planted out with safety, when the later sprouting forest trees put forth.

Argemone grandiflora.
 ——— *Mexicana.*
Aster sinensis.
Atropa physaloides.
Bidens heterophylla.
Cacalia coccinea.
Carthamus tinctorius.
Centaurea Americana.
Celsia orientalis.
Chrysanthemum.
Cistus niloticus.
Cobœa scandens (climber).
Convolvulus discolor.
 ——— *michauxii.*
 ——— *purpurea.*
Coreopsis (Calliopsis) Drummondii.
Cucumis colocynthis.
 ——— *dudaim.*
 ——— *flexuosus.*

Datura ceratocaulon.
 ——— metel.
Dianthus sinensis.
Elichrysium macranthum.
Fumaria vesicaria.
Galinsogia parviflora.
 ——— triloba.
Gnaphalium fœtidum.
 ——— undulatum.
Helianthus annuus.
Ipomœa coccinea.
 ——— phœnicea.
Loasa aurantiaca (climber).
Lobelia azurea.
Lopezia racemosa.
Lophospermum scandens (climber).
Mirabilis jalapa.
 ——— lutea.
 ——— longiflora.
Momordica balsamina.
 ——— luffa.
Monopsis scintillaris.
Nicotiana glutinosa.
 ——— paniculata.
 ——— tabac.
Nolana prostrata.
Pharbitis (*Ipomœa*) *hispida* (climber).
Podolepis gracilis.
Polygonum orientale.
Ricinus communis.
 ——— inermis.
 ——— viridis.
Ricotia ægyptiaca.
Rudbeckia amplexifolia.
Schizanthus pinnatus.
Senecio elegans.
Spilanthes acmella.
Stevia pedata.
 ——— serrata.
Tagetes erecta.
 ——— lucida.
 ——— nana.
 ——— patula.
 ——— tenuifolia.
Trichosanthes anguina.
 ——— cucumeri.
Tropœolum atrosanguineum (climber).
 ——— peregrinum (climber).
Verbena Aubletia.
Viscaria oculata.
Xeranthemum lucidum.
Ximensia encelioides.
Zinnia coccinea.
 ——— multiflora.
 ——— lutea.
 ——— pauciflora.
 ——— revoluta.
 ——— verticillata.
 ——— violacea.

TENDER ANNUALS.

The following are rather more tender than those classed as half-hardy, but may be managed in the same manner.

Achillea ægyptiaca.
Agapanthus umb. maj.
 ——— media.
 ——— minor.
Amaranthus bicolor.
 ——— cruentus.
 ——— rubicaulis.
 ——— tricolor.
Amethystea cœrulea.
Antirrhinum molle.
Brachycome iberifolia.
Browallia demissa.
 ——— elata cœrulea.
 ——— flo. albo.
Buchnera capensis.
 ——— fœtida.
Calceolaria pinnata.
Campanula capensis.
 ——— debilis.
 ——— mollis.
Cardiospermum halicacabum.
Cassia chamæchrista.
 ——— tora.
Celosia argentea.
 ——— cernua.
 ——— cristata rub.
 ——— dwarf, red.
 ——— tall, buff.
 ——— dwarf.
 ——— imperial red.
 ——— purple.
 ——— buff.
 ——— varieg.
Cleome pentaphylla.
 ——— spinosa.
 ——— viscosa.
Clitoria brasiliana.
 ——— ternata.
 ——— flo. albo.
Convolvulus pes capræ.
 ——— nil.
 ——— tridendatum.
Crotalaria juncea.
 ——— verrucosa.
Datura fastuosa.
 ——— flo. albo.
Gnaphalium orientale.
Gomphrena globosa.
 ——— flo. albo.
 ——— stri.
Hedysarum gangeticum.
 ——— vespertilio.
Heliophila integrifolia.
Heliotropium indicum.
Impatiens balsamina.
 ——— flesh col. dble.

Impatiens bizar, tall, dble.
 ————— dwarf, dble.
 ————— pur. stri., dble.
 ————— scarl. stri., dble.
Ipomœa Phœnicea.
 ————— quamoelit.
 ————— flo. albo.
Linum flavum.
 ————— suffruticosum.
Lotus creticus.
Lobelia gracilis.
 ————— ramosa.
Martynia fragrans.
 ————— proboscidea.
Mesembryanthemum crystallinum.
 ————— glabrum.
 ————— pinnatifidum.
 ————— (tricolor) pyropœum.
Mimosa pudica.
 ————— sensitiva.
Ononis natrix.
 ————— crispa.
Pentapetes Phœnicea.
Physalis prostrata.
Portulaca splendens.
 ————— Thellussoni.
Rhodanthe Manglesii.
Salpiglossis atropurpurea.
Sedum cœruleum.
Sida cordifolia.
 ————— dilleniana.
 ————— hastata.
Solanum melongana.
 ————— fruct. purp.
Sowerbia juncea.
Statice mucronata.
Thunbergia (alata) aurantiaca.
 ————— albiflora.
Trachymene (Didiscus) cœrulea.
Watsonia corymbosa.
ANODONTIA. Four species. Hardy and half-hardy plants. Seeds, cuttings, or division. Common soil.
ANÆCTOCHILUS *setaceus*. Stove terrestrial orchidaceous plant.
ANOMATHECA. Two species. Half-hardy bulbs. Seeds. Common light soil.
ANONA. Custard apple. Seventeen species. Cuttings or seeds. Rich loam.
ANT, (Formica.) To drive this insect away, sprinkle flowers of sulphur over its nests and haunts. To kill it, pour over the nest at night a strong decoction of elder leaves. To trap it, smear the inside of a garden pot with honey, invert it over the nest, and when crowded with them, hold it over the steam of boiling water. They may be kept from ascending standard and espa-

lier trees, by tying a piece of wool round the stems and the supporters.

ANTENNARIA. Eight species. Chiefly hardy herbaceous. *A. hyperborea* is an evergreen creeper. Cuttings or divisions. Light rich soil.

ANTHEMIS. Forty-six species. All hardy except *A. apifolia* and *punctata*, which are green-house plants. Seed. Common soil. See *Chamomile*.

ANTHERICUM. Twenty-six species. Green-house herbaceous, except *A. scro-tinum* and *sulphureum*, which are hardy. Cuttings or seed. Loam and sandy peat.

ANTHOCERCIS. Three species. Green-house evergreen shrubs. Cuttings. Loam and peat.

ANTHOCLEISTA *macrophylla*. Stove evergreen tree. Cuttings. Peat and loam.

ANTHODON. Two species. Stove evergreen shrubs. Cuttings. Rich loam and peat.

ANTHOLOMA *montana*. Stove evergreen shrub. Cuttings. Rich loam and peat.

ANTHOLYZA. Three species. Hardy bulbs. Offsets. Sandy south border.

ANTHOMYIA, a genus of fly, very injurious to the gardener.

A. brassicæ, cabbage fly, says Mr. Curtis, "is found on the wing through the summer, and is the parent of a maggot which has been known to lay waste whole fields of cabbages by diseasing the roots, in which they feed, as well as at the base of the stalk. Successive generations are feeding until November; the latter families lying in the pupa state through the winter, and most probably some of the flies survive that season, secreted in holes and crevices.

"When the Cabbage-leaves assume a lead or yellow colour, and droop in mid-day from the effect of the sun, such plants being diseased should be taken up, carried away, and burnt, and brine or lime put into the holes. Gardeners, in some instances, have collected large quantities of the pupæ from the roots, by drawing away the earth; and as these insects are exceedingly rapid in their transformations, it is very likely that it may have a very material effect in checking their increase, and giving the succeeding crop a better chance of escaping the fate of the preceding one.

"The male of *A. brassicæ* is dark bright grey, with black bristles; there is

a black stripe half way down the middle of the thorax, and a curved one on each side; the body has a more decided black stripe down the centre, and the segments are marked by a line of the same colour; legs and antennæ blackish; wings a little smoky. The female is pale ashy grey; the eyes remote, with a dark chestnut-coloured stripe on the crown; the wings are similar in tint to those of the foregoing species, but the insects are considerably smaller.”—*Gard. Chron.*

A. ceparum, Onion fly. For the following particulars I am indebted to the work of M. Kollar.

“The fly lays her eggs on the leaves of the onion, close to the earth.

“The newly-hatched maggot bores through the first leaf and then descends between the leaves into the onion to its base, when it entirely destroys the bulb, which soon becomes rotten. It leaves the onion to undergo its transformation in the earth, and becomes an elliptical, reddish-brown, wrinkled pupa, out of which the perfect fly is developed in summer in from ten to twenty days. The later brood pass the winter in the pupa state.

“The perfect insect or fly is entirely of an ash grey colour in the female, or with black stripes on the back of the male; the wings clear like glass, with broad iridescent reflections, and yellowish-brown veins. It is found throughout the summer in several generations.

“The larva lives during that season singly, and also gregariously, on the different sorts of leeks and onions, and does great damage among the white onions.”

The maggot is conical, white, and smooth. It will never make its appearance, if, at the time of sowing, a little of the lime from the dry purifiers of the gas-works be dug in and a less quantity raked in with the seed. This may now be obtained almost in every district of Great Britain; but should it be neglected, or not obtainable, soot applied in the same mode, with the addition of one or two plentiful waterings, during April and the present month, with strong soapsuds, will generally prevent the evil.—*Johnson's Gard. Almanack.*

A. lactuca, Lettuce fly. Mr. Curtis says, “The larvæ first make their appearance in August, but they are abundant in September; they closely resemble those from the Cabbage and Turnip, being of a yellowish-white colour, taper-

ing towards the head, which is pointed, and armed with two short, black claws at the nose.

“These maggots live in the involucra of different varieties of Lettuce, feeding upon the grains and receptacle; and when these are consumed they wriggle themselves out backward, either to enter another seed-vessel or fall to the ground and become pupæ.

“When the seed-stems are gathered and dying, the larvæ change to pupæ, called shucks in Surrey, being bright chestnut-coloured, oval cases, which are rough when viewed under a lens, with two minute tubercles at the head, and two hooks and a few other tubercles at the tail.

“In the second week of May a few of the pupæ hatch; they have, however, been observed as early as April, and as late as July. The male is intense black, clothed with short hair and bristles; the eyes reddish-brown and meeting above; face inclining to chestnut colour, with a bright spot of the same on the crown; the fore part of the trunk bears four varying whitish stripes; the body is ashy grey, the segments blackish, at the base a deep black; wings two, stained with black, and beautifully iridescent; the base and poisers ochreous, the nervures of the wings pitchy.

“The female is entirely ashy grey, and less bristly; the eyes not meeting on the crown, with a bright chestnut-coloured stripe between them; body oval, the apex cone-shaped; horns and legs blackish; wings and nervures lighter than in the male, which it equals in size.”—*Gard. Chron.*

ANTHONOMUS.

A. pomorum, Apple weevil. Mr. Curtis truly observes, that “this insect commits great devastation in apple orchards, by destroying the stamens, pistil, and receptacle of the flower. As soon as the blossom buds begin to swell, the female beetle begins to deposit her eggs. In calm weather she selects a good bud, and makes a hole in it with her proboscis; she fixes herself at the hole, lays one egg, and goes on till she has deposited a considerable number of eggs in separate buds.

“The bud continues to swell and the petals nearly expand, when suddenly the growth ceases and the petals wither and assume a shrivelled appearance. If one of these flower buds be examined

when nearly expanded, a small white grain with a black head will be found in the centre, which begins to assume a yellowish colour; a few days later the grub will be found either wholly or partially changed to a beetle, and should there be a small hole on the side of the receptacle the beetle will have escaped; the transformation from the egg to the perfect state not having occupied more than a month. When this beetle, which is dark brown with grey stripes, leaves the receptacle, it feeds during the summer on the leaves of the trees, and is seldom to be seen. In the autumn, the weevils leave the trees and search for convenient hiding-places under stones about the trees, or under the rough bark, in which they pass the winter.

"Consequently, as they commence their operations early in the spring, care should be taken to remove all stones, dead leaves, and other litter from under the trees, as well as to scrape off the rough dead bark from them in the winter season.

"The apple weevil is also very injurious to pear trees."—*Gard. Chron.*

ANTHOPHYUM lanceolatum. A stove fern. Seed. Light rich soil.

ANTHOSPERMUM athiopicum. Green-house evergreen shrub. Cuttings. Loam and peat.

ANTHYLLIS. Twenty-two species. Hardy herbaceous and green-house evergreens. Seeds or cuttings. Sandy loam and peat.

ANTIDESMA. Three species. Stove evergreen shrubs. Cuttings. Rich loam.

ANTIRRHINUM. Snap-dragon. Twelve species. Hardy herbaceous, except *A. asarina* and *molle*, which are half-hardy evergreens. Cuttings or seeds. Common soil.

ANTLER MOTH. *Charæas*.

ANTWERP HOLLYHOCK. *Althæa ficifolia*.

ANYCHIA dichotoma. Hardy biennial. Division and seed. Sand and loam.

AOTUS. Three species. Green-house evergreen shrubs. Cuttings. Loam and sandy peat.

APEIBA. Four species. Stove evergreen trees. Cuttings. Loam and peat.

APIANANTHE celosioides. Green-house evergreen shrub. Cuttings. Peat and loam.

APIANOCHILUS incisus. Hardy herbaceous. Cuttings. Light soil.

APHELANDRA cristata. Stove evergreen shrub. Cuttings. Loam and peat.

APIELEXIS. Four species. Green-house evergreen shrub. Cuttings. Peat and sandy loam.

APHIS, the Plant Louse, *Puceron*, or Vine fretter. This insect, so destructive from its multitude, attacks fruit trees, juicy kitchen vegetables, and other plants, weakening and rendering them incapable of development by sucking from them their juices. The exhaustion thus occasioned is sometimes so complete as to destroy the plant. Each vegetable subject to its ravages has its peculiar species.

Aphis pyri mali is of a grass green colour, attacking the apple and pear.

A. persica is dark green, and is peculiar to the peach and nectarine.

A. pruni ravages the plum tribes, and is a very light green.

A. rosa. Light green, found upon the rose genus.

A. fabæ, known popularly as the *Black Dolphin* and *Elephant*, is black, and attacks the common bean.

The tops of beans attacked by the Black Dolphin should be forthwith removed; and smaller plants may be syringed with tobacco-water, or water in which elder leaves have been boiled; which applications are all fatal to the aphids.

A. pisi is green, and affects the pea. *A. lonicera*, Woodbine louse. Dingy green.

A. cerasi, Morello cherry louse. Appears black. Infests the under sides of the leaves, especially on wet soils.

A. coryli, Nut louse. Pale green.

A. Dahlia, Dahlia louse. Amber coloured.

A. ribis, Red currant louse. Blackish.

A. ligustri, Privet louse. Dark brown.

A. ribis-nigri, Black currant louse.

Transparent green.

A. lathyri, Sweet pea louse. Dark purple.

A. (Cinara) raphani, Radish louse. Females, green; males, lightish red.

The aphides on the peach appear the earliest, being, as are all the others, the produce of eggs deposited during the previous autumn. During the spring and summer they are viviparous, and breed with extraordinary rapidity. The gardener does well, therefore, to scrub the branches of his wall trees, and to boil

or change the shreds every winter, for he thus destroys the pest in embryo. So soon as they appear in spring, over each wall tree a mat should be fastened, and tobacco burnt beneath it. Peas, whilst the dew is upon them, may be dusted with Scotch snuff. Over the apple, plum, and other standards, the only available remedy is a repeated application of quicklime, at the same early period of the day, by the means of Curtis' Lime Duster. Most of these insects are readily destroyed by an application of diluted whale oil soap; it is probable a solution of common soft soap would be equally effective. The inexperienced operator should be careful lest he apply it in too powerful a state.

The larvæ of the *Coccinella* or Ladybird, especially *C. punctata*, the *Syrphus* or bee-like fly, the *Heimerobius* or golden-eyed fly, the ant, some caterpillars, and many of the *Ichneumonidæ*, are great destroyers of the Aphis, and should be encouraged rather than removed. See *American Blight*.

APHYLLANTHES monspeliensis. Half-hardy herbaceous. Division and seed. Sandy peat.

APICRA. Twelve species. Green-house succulents. Suckers. Sandy loam and peat.

APIOS tuberosa. Hardy tuber. Root. Sand and peat.

APIUM. Six species. See *Celery*, *Celeriac*, and *Parsley*.

APONOGETON. Four species. Stove or green-house aquatics. Offsets or seeds. Loam and peat in water.

APPLE. (*Pyrus malus*.)

Varieties.—There are 1,496 named varieties in the last edition of the London Horticultural Society's List of Fruits, of which they have 897 cultivated in their gardens. It may readily be presumed that in such a multitude there are many of inferior quality; indeed it is not improbable there are some utterly unworthy of culture. The object in thus congregating them was praiseworthy—to determine their comparative value. The true policy is evidently to select from the mass those which, from some special quality, are most deserving of perpetuity. The following named varieties are believed to be eminently worthy of culture. We copy from the catalogue of D. Landreth and Fulton.

EXPLANATION OF ABBREVIATIONS.—*Colour*—r red; str striped; y yellow; g green. *Size*—L large; M medium; s small.

Those marked * are of American origin.

Those marked † are celebrated for the table.

SUMMER APPLES.

NAME.	COLOUR.	FORM.	SIZE.	QTY.	SEASON.
Red Astrachan	r	roundish	M	1	July to Aug.
*†Bevan	str r	flat	L	1	July Aug.
English Codlin	y	conical	L	1	Aug. Sept.
†Early Queen	r str	roundish	M	1	July Aug.
*†Early Harvest	y	roundish	M	1	July Aug.
Summer Queen	str	roundish	M	1	July Aug.
*Lippincott	r	oblong	M	1	July Aug.
Siberian Crab	y	conical	S	2	Aug. Oct.
Woolman's Harvest	str	roundish	M	1	Aug. Sept.
*†Summer Pearmain	r	oblong	L	1	Aug. Sept.
Juneating Red	y str	ovate	M	1	July Aug.

FALL AND WINTER APPLES.

Alexander	y str	conical	L	1	Oct. to Dec.
†Baldwin	r	roundish	L	1	Nov. Mar.
*†Bellflower, Yellow	y	conical	L	1	Oct. Feb.
*Carthouse	r	flat	M	1	Dec. Apl.
Codlin Irish	y	conical	L	2	Oct. Dec.

NAME.	CO- LOUR.	FORM.	SIZE.	QTY	SEASON.
Codlin White	y	conical	L	2	Oct. to Dec.
*Cumberland Spice	y	flat	M	1	Nov. Feb.
Doctor or <i>Dewitt</i>	str	roundish	L	2	Oct. Jan.
*†Greening, Rhode Island	g	roundish	L	1	Oct. Feb.
Ladies' Sweeting	y r	roundish	L	1	Oct. Apl.
Gates' Apple	y	roundish	M	1	Nov. Feb.
*Grindstone	str	roundish	L	2	Oct. June
Gravenstien	str	roundish	L	1	Oct. Nov.
Hawthornden	y	roundish	L	1	Oct. Dec.
Harrison	y	conical	M	2	Nov. Apl.
Lady Apple, <i>pomme d' Api</i>	y	flat	S	1	Nov. Mar.
Tolman's Sweeting	y	roundish	M	1	Nov. Mar.
Lady Finger	r	oblong	M	2	Nov. Feb.
*†Maiden's Blush	y r	flat	M	1	Sept. Nov.
*Morgan	r	roundish	L	1	Oct. Dec.
*†Northern Spy	r	conical	L	1	Dec. April
Pearmain, Blue winter	r	conical	L	1	Nov. Jan.
*Pennock's Red	g	roundish	L	2	Nov. Mar.
Pippin, Bullock	y	roundish	S	2	Dec. Mar.
“ Golden	y	roundish	S	1	Nov. Mar.
“ *American	y	roundish	L	1	Dec. Mar.
“ *Michael Henry	y	oblong	M	1	Nov. Mar.
“ Fall, or Holland	y	flat	L	1	Oct. Jan.
“ Blenheim	y	roundish	L	2	Nov. Jan.
“ Ribston	y	roundish	M	1	Nov. Jan.
“ *Hollow Core	y	roundish	L	1	Nov. Mar.
“ *†Green Newton	g	roundish	M	1	Dec. April
“ *†Yellow Newton	y	roundish	M	1	Dec. April
Priestley	str	oblong	L	1	Dec. April
Pound Apple	g	roundish	L	2	Oct. Jan.
*†Porter	y	oblong	L	1	Sept. Nov.
*†Roxbury Russet	y	roundish	L	1	Dec. May
Roman Stem	y	round	L	1	Oct. Jan.
Rambo	y	flat	M	1	Oct. Dec.
*Seek-no-further, Red	r	round	L	1	Nov. Apl.
Newton Spitzenburg	y r	roundish	M	2	Nov. Feb.
*†Spitzenburg, <i>Esopus</i>	str	conical	L	1	Nov. Apl.
*†Spitzenburg, <i>Kaighn's</i>	r	round	L	1	Nov. April
Sweeting, <i>Moore's</i>	y	round	L	1	Dec. Mar.
*Swaar	y	roundish	L	1	Nov. Mar.
*†Tewksbury Blush	r	round	S	1	Jan. May
*†Vandervere	y	flat	M	1	Oct. Feb.
*Wine, or Hay's	r	round	L	1	Nov. Mar.
*Winesap	r	round	M	1	Nov. Apl.
*Winter Queen	r	conical	L	2	Nov. Mar.
Yorkshire Greening	g	round	L	1	Dec. Feb.

The following outlines and descriptions of a few prominent varieties of apples, may be interesting to those who do not possess a more elaborate work, or one wholly devoted to Fruits, and are inserted with a desire to increase the popular character of the Dictionary, and render it of increased interest to the mass of readers.

SUMMER QUEEN. *Core.* (Fig. 1.)

This is quite a distinct variety from one long known around Philadelphia as the Early Queen. It is of full medium size, the outline in some specimens rather longer than broad, the blossom end occasionally quite pointed. Skin yellow, clouded and striped with red, so much so in some instances as to

obscure the ground colour. Flesh yellow, rich and aromatic. Stem long, deeply planted. Ripe in August, but fit for cooking in July. Coxe describes it as an apple of the finest quality, and

of uncommonly beautiful appearance. It is certainly a superior dessert fruit; its sprightly aroma is agreeable to most palates, and makes it a popular apple in the Philadelphia market.

Fig. 1.—(P. 43.)



SUMMER PEARMAIN. *Coxe.* (Fig. 2.) This is unquestionably the finest apple of its season, possessing more of the character of the pear than an ordinary apple; its appearance is by no means prepossessing, and those who look to exteriors only would pass it by unnoticed. The colour is usually dull red, slightly streaked and spotted, occasionally in the sun of a brighter hue. Coxe says it has proved well adapted to light lands, and correctly describes it as singularly tender, bursting from its own weight, when falling. The outline is oblong, uniformly regular; stem and calyx deeply seated; ripe in August and September.

WOOLMAN'S HARVEST. (*Striped Harvest.*) (Fig. 3.) This apple is known in New Jersey as above; its origin is obscure, nor have we found it described by any American authority.

The size is much below medium, weighing scarcely two ounces. Ground colour a delicate whitish yellow, beautifully streaked and pencilled with bright red of different depths, giving it rather an artificial aspect, as though an artist had coloured it to suit his fancy; flesh white, crisp and tender, juicy, but not rich;—its early maturity commends it to notice; ripe in July.

MAIDEN'S BLUSH. *Coxe.* (Fig. 4.) There is not, perhaps, a more popular summer apple in the Philadelphia market than this; it ripens in August, and is in fruitful seasons abundant until the first of October. The size is above medium; skin smooth, yellow, with a lively carmine cheek; the general outline is flattened. Flesh white, tender, admirably adapted to drying. Stem short, and both it and the eye seated in a deep cavity. The habit of the tree is

Fig. 2.—(P. 44.)

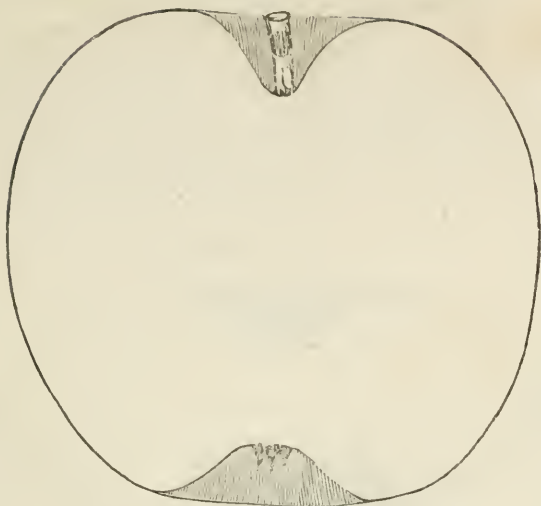
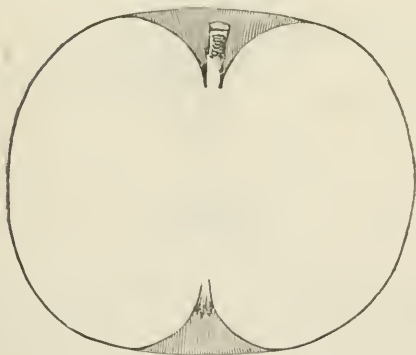


Fig. 3.—(P. 44.)



vigorous, forming an open and rather spreading head.

EARLY BOUGH. *Ken.* (*Bough Apple.* *Coxe.*) (Fig. 5.) The Early Bough is frequently above medium size; outline rather longer than broad. Stem seldom rising to the crown of the fruit. Skin smooth, of a pale yellow hue. Flesh white, with more than ordinary juice; sweet and well-flavoured, though by no

means rich. It is of fair quality, and because of its early maturity generally esteemed. Ripe in July and August.

HAGLOE. (*Hagloe Crab* of *Coxe: Downing.*) (Fig. 6.) There is evidently some blunder as regards this apple, which was imported by Coxe, and described by him. It is unquestionably not the Hagloe Crab of the English, a cider apple of high repute, to which,

Fig. 4.—(P. 44.)

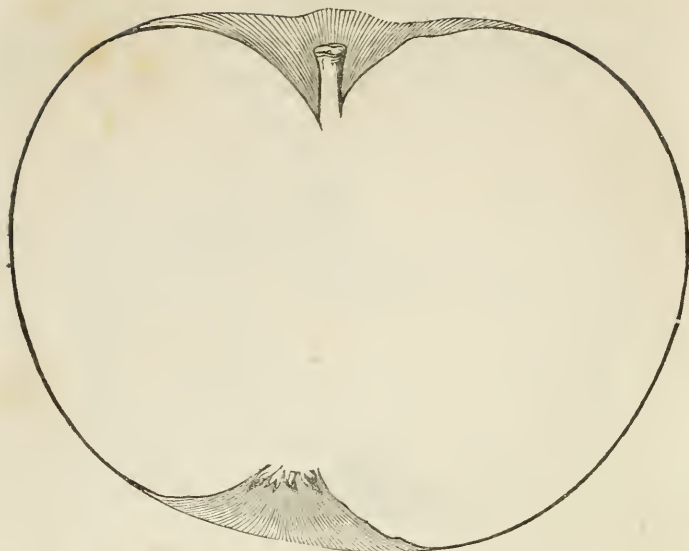
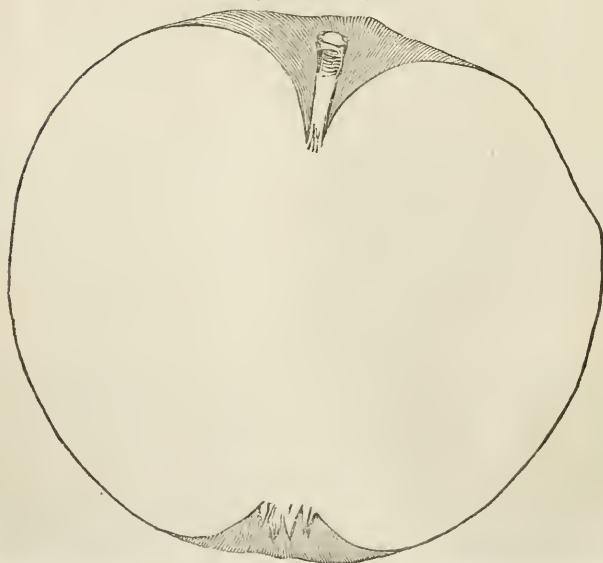


Fig. 5.—(P. 45.)

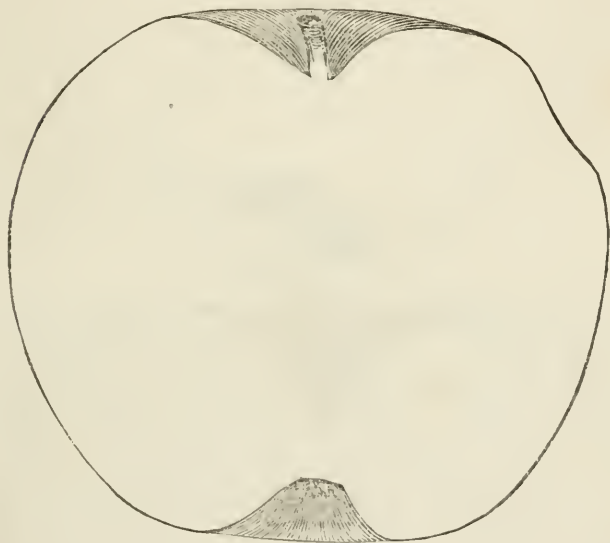


it is believed, this has no pretension. It is said that Coxe himself discovered the error, and designed correcting it in a future edition of his work. It occurred from the label having been lost in the original package, and a loose Hagloe Crab label being found, was supposed to attach to the tree in question.

It is now well known in Pennsylvania and New Jersey, as the Hagloe, the Crab having been dropped, and is much esteemed in the Philadelphia market as a cooking apple; its fair size, above

medium, and great beauty, recommend it for the table. The prevailing colour is yellow, streaked with red of darker or lighter shades, and with a delicate bloom on well-ripened specimens. The outline round, sometimes a little irregular. Stem short; the eye deeply seated. The flesh is soft and woolly, as it is termed, which of course detracts from its quality as a table fruit. Ripe, August and September.

Fig. 6.—(P. 45.)



EARLY QUEEN. (Fig. 7.) The apple here represented, has been known for many years around Philadelphia by the above name; it is one of the earliest seen in our market, making its appearance early in July and continuing throughout August. When ripened in the sun it is nearly of a uniform aspect—striped and clouded with red of darker or lighter shades on a greenish-yellow ground, the red frequently the prevailing colour: others ripened in the shade have but little red, the stripes more distinctly marked on a greenish ground, thus presenting fruit from the same tree

of very different appearance. The size is in good specimens, above medium; outline rather flattened, and narrowing towards the blossom end. Calyx quite small, nearly closed and set in a shallow basin. Stem short, seldom rising to the crown of the fruit. Flesh white, with occasional pink streaks and clouds; crisp, and when over ripe, mealy.

BALDWIN. *Ken: Down.* (Fig. 8.) The Baldwin, partially known as the Woodpecker, is nearly confined to New England; but ought to be an apple of the world. It has few superiors, and is above average quality in all respects.

Fig. 7.—(P. 47.)

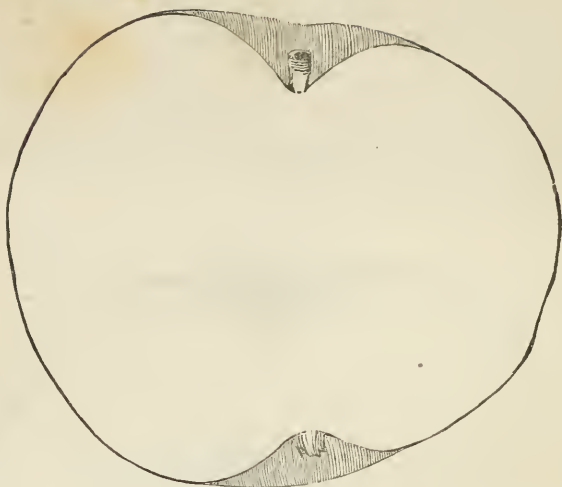
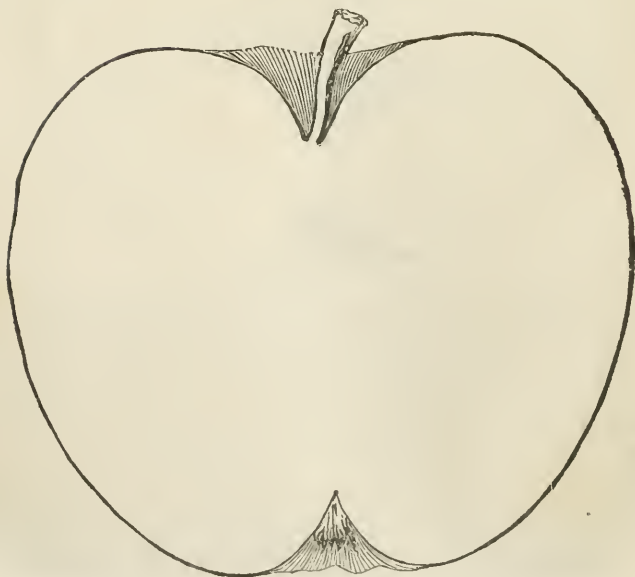


Fig. 8.—(P. 47.)



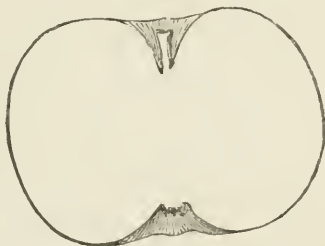
Its flavour is rich and sprightly. Flesh yellowish and crisp; few taste it without admiration.

The outline is round, flattened at the stem end and narrowing towards the eye; ground colour yellow obscured by red and crimson shading and slightly marked by russet near the stem, which is rather deeply planted. In season from November to March.

LADY APPLE. *Coxe.* (*Pomme d'Api. Rouge. Petit and Gros Api. Rouge*, of the French.) (Fig. 9.) The small size of this beautiful fruit may be

an objection with many, but it is undoubtedly worthy a place in every orchard from its exquisite beauty and fine quality. The Lady Apple is highly prized wherever quality, rather than bulk is considered as the test of value. At Philadelphia it is a great favourite, and commands ready sale. The outline is flat, colour when well ripened a lively yellow, with a bright carmine cheek. Flesh white and crisp; juice sprightly and agreeable; bears abundantly. Ripe in December, and keeps well during winter.

Fig. 9.



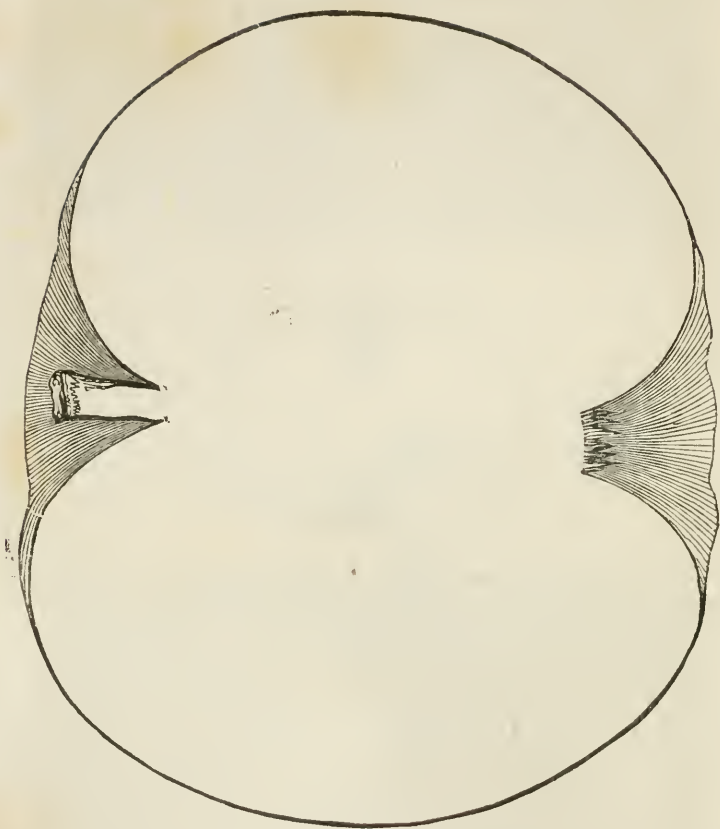
GLORIA MUNDI. *Thomp. Monstrous Pippin. Coxe. Golden Ball. Ken.* (Fig. 10.) *Coxe* says this imposing apple originated on Long Island, N. Y. Downing supposes it to be originally from Maine; the fact is unimportant. Its large size renders it an object of popular regard; it is an admirable cooking apple though not profitable, from liability to be blown off prematurely. Skin yellow, marked by bright spots or dots. Flesh juicy and sprightly. The outline is round; stem short; eye bushy. In season, November to March. A specimen at the Pennsylvania Horticultural Society's exhibition, September, 1846, weighed 27 ounces.

BELL FLOWER. (Fig. 11.) "A remarkably large, beautiful and excellent apple, both for the dessert and for cooking—it is of a pale, but bright and fair yellow colour; the cheek next the sun has sometimes a blush, but more frequently is without any red: the form is oblong, somewhat pointed at the blossom end—both ends are deeply indented—the flesh is rich, juicy, tender and sprightly; it has uncommonly large full seeds, which are lodged in a peri-

carpium of unusual size, and if shaken can be distinctly heard; it ripens late in October, when its great weight causes it to fall in windy weather—if carefully picked before they are too ripe, they will keep in high perfection through the winter, till late in the spring, especially when they are shrivelled or wilted—from their beauty and excellence, they are the most popular apple in the Philadelphia market: the tree grows very large and spreading; it should be trained high, or the limbs will touch the ground when in full bearing; it succeeds best on light rich soils."—*Coxe.*

RHODE ISLAND GREENING.—*Coxe.* (Fig. 12.) A well known variety, extensively disseminated throughout the Atlantic States. The size is large; outline round; skin of a yellowish green; sometimes, though very seldom of a faint blush-like hue towards the stem. The flesh is crisp, abounding in juice, finely flavoured; stem short. Calyx rather small for so large an apple, and placed in a shallow basin. In season from October to January, sometimes later.

Fig. 10.—(P. 49.)

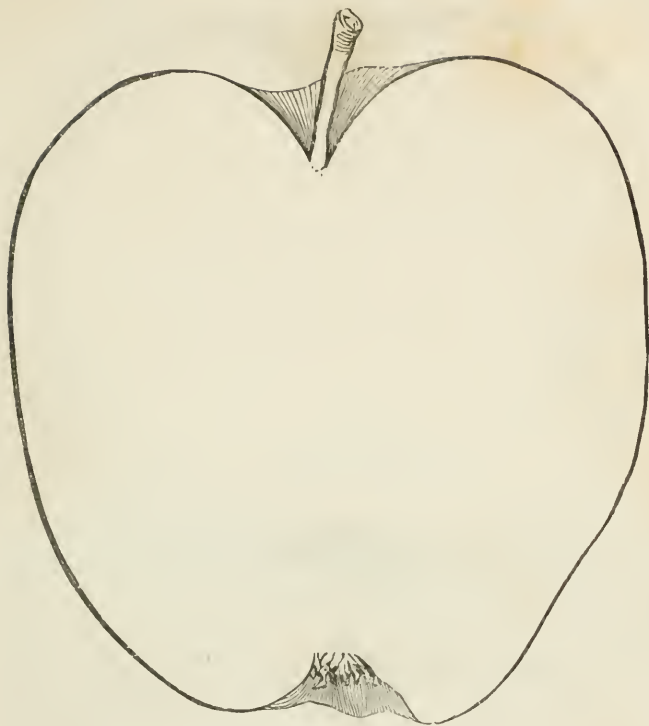


NEW ENGLAND RUSSET. *Boston or Roxbury Russet or Russeting*. (Fig. 13.) This is claimed as a native of Massachusetts, and is held throughout New England in high repute. It is usually considered the best of its class popularly termed "leather-coats." The size is full medium; form irregularly round, flattened at both stem and blossom end. When fully ripe of a russet hue, occasionally with indications of blush. It is in season at mid-winter, but may be kept till May or June; indeed they may be seen sometimes in

July. This property of long keeping in connection with its productive habit, has secured it great popularity.

YELLOW NEWTOWN PIPPIN. (Fig. 14.) "This is in most of its varieties the finest apple of our country, and probably of the world. It varies much in quality, with soil, aspect, cultivation, climate and age. The form is rather flat, the size large, the skin a greenish yellow, with black clouds, and frequently with red spots or blotches. It ripens in November, and is often kept till May and June. It will produce fine

Fig. 11.—(P. 49.)



apples on even a light sandy soil, aided by the application of river or meadow mud as a manure, two or three cart loads to a tree.”—*Core*.

WINE APPLE. (Fig. 15.) This is a well known variety in Philadelphia. It is unusually large, and attractive from its beautifully fair and handsome appearance. The outline is round, rather flattened at the poles; prevailing colour red, shaded and spotted with yellow. Stalk quite short, never rising to the crown of the fruit, which is occasionally of a russet hue, Calyx large and deeply seated, ripe in October, and in eating through the autumn and winter. It is equally adapted to the table, kitchen and press. The habit of the tree is open, growth large and handsome.

ÆSOPUS SPITZENBURG. *Thomp. Lind. Ken.* (Fig. 16.) There are but few, very few apples to which higher rank is awarded than to this variety, which has the rare advantage of beauty and goodness combined. It is said to have originated at Æsopus on the Hudson river. The size full medium, with an oblong outline. Skin fair and smooth, of a fine clear red, in some specimens of a brilliant hue on the sunny side, the opposite of a yellowish cast. Flesh yellow, and in the language of Coxe, “singularly rich, juicy and sprightly.” Stem of medium length, well planted. Calyx in a shallow depression. In season November to February.

KAIGHN’S SPITZENBURG. *Core.* (Fig. 17.) This variety takes its name from the original cultivator, the late Joseph Kaighn, of Kaighn’s Point, New Jersey.

Fig. 12.—(P. 49.)

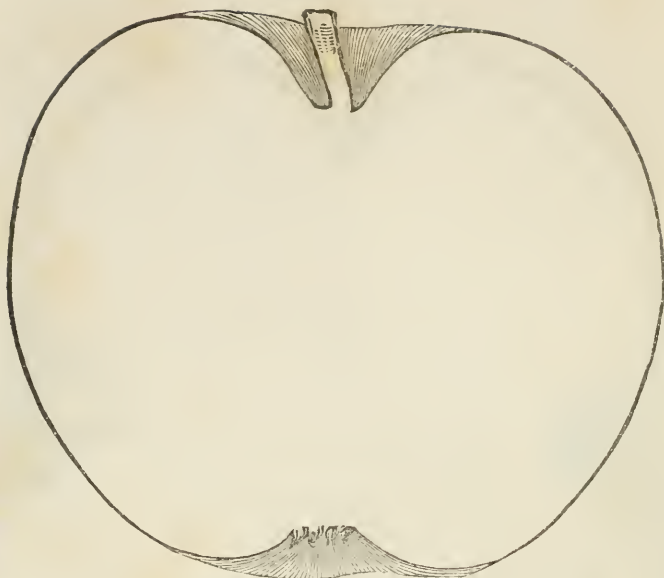


Fig. 13.—(P. 50.)

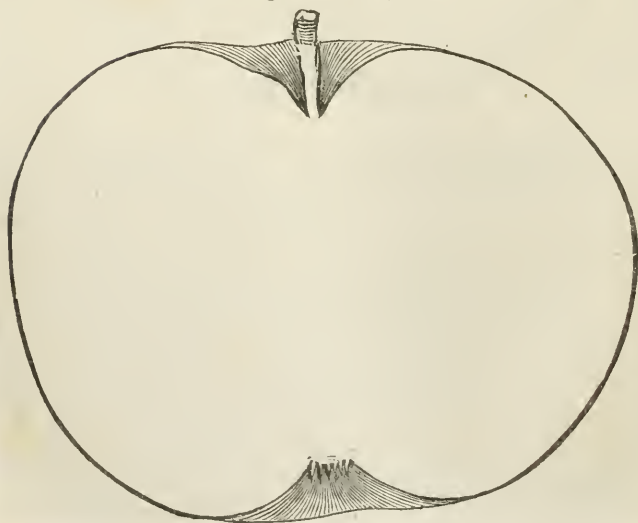
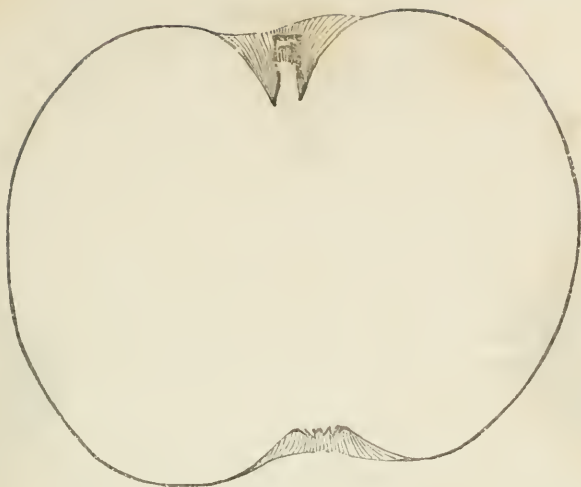


Fig. 14.—(P. 50.)



It somewhat resembles the *Æsopus Spitzenburg*. Colour bright red, delicately streaked and marked by white dots, which strongly characterize it. Skin smooth; flesh juicy and well flavoured; stem rather long, deeply seated; blossom end frequently more pointed than in the drawing.

Propagation by seed.—When it is intended to raise stocks to be engrafted, the only matter to be observed in selecting the seed is, that it be from vigorous healthy trees. Keep the seed in sand, or earth moderately damp, during autumn and winter, and sow quite early in the spring, and in drills, so as to admit of more easy culture. The second season the young stocks may be transplanted, and again the third season, each transplantation tending to secure success on the final transfer to the orchard ground.) When three years old, they will be, if well managed, stout stocks, ready for grafting.

Where the object is to produce new varieties, select the seed from favourite fruits and sow as above directed.

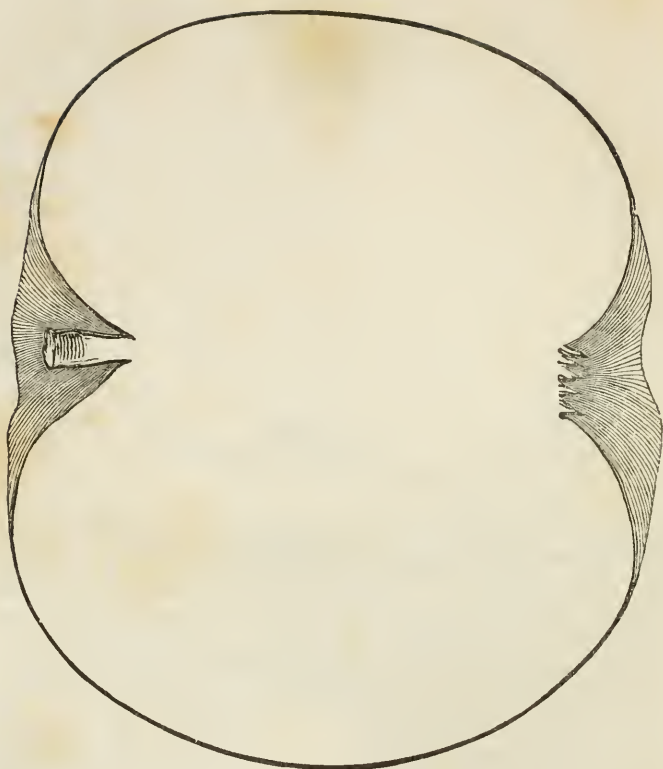
If it be the purpose to allow the seedlings to bear, they may be suffered to remain where they have first grown, or they may be transplanted to any other position. But a more speedy method

to reach results is to graft a shoot of the seedling in a branch of a vigorous tree. The second season fruit may be obtained, especially if the shoot is bent downwards, or inclined, so as to arrest the free flow of sap, which would rather tend to preserve wood than fruit. By this means curiosity can be early satisfied, and those which prove worthless, by far the larger portion, cast out as cumberers of the ground.

Mr. Knight states that “the width and thickness of the leaf generally indicates the size of the future apple, but will by no means convey any correct idea of the merits of the future fruit.

“When these have the character of high cultivation, the qualities of the fruit will be far removed from those of the native species; but the apple may be insipid or highly flavoured, green or deeply coloured, and of course well or ill-calculated to answer the purposes of the planter. An early blossom in the spring, and an early change of colour in the autumnal leaf, would naturally be supposed to indicate a fruit of early maturity, but I have never been able to discover any criterion of this kind on which the smallest dependence may be placed. The leaves of some varieties will become yellow and fall off, leaving

Fig. 15.—(P. 51.)



the fruit green and immature; and the leaves in other kinds will retain their verdure long after the fruit has perished. The plants whose buds in the annual wood are full and prominent are usually more productive than those whose buds are small and shrunk in the bark; but their future produce will depend much on the power the blossoms possess of bearing the cold, and this power varies in the varieties, and can only be known from experience. Those which produce their leaves and blossoms rather early in the spring are generally to be preferred, for, though they are more exposed to injury from frost, they less frequently suffer from the attacks of insects

—the more common cause of ailure. The disposition to vegetate early or late in the spring, is, like almost every other quality in the apple tree, transferred in different degrees to its offspring; and the planter must therefore seek those qualities in the parent tree which he wishes to find in the future seedling plants. The best method I have been able to discover of obtaining such fruits as vegetate very early in the spring, has been by introducing the farina of the Siberian Crab into the blossom of a rich and early apple, and by transferring, in the same manner, the farina of the apple to the blossom of the Siberian Crab. The leaf and the habit

Fig. 16.—(P. 51.)



of many of the plants that I have thus obtained, possess much of the character of the apple, whilst they vegetate as early in the spring as the crab of Siberia, and possess at least an equal power of bearing cold; and I possess two plants of the family which are quite as hardy as the most austere crab of our woods."

By cuttings.—All the varieties may be raised in this mode, though some, as the Burr-knot, Codling, and June-eating, more readily than others. Trees so raised are said to be not so liable as their parents to canker. In February take cuttings of young shoots from some of the horizontal branches, about eight inches long, cutting off a portion of the old wood of the branch attached to the shoot; remove all the buds except the upper three. Plant these firmly in sandy loam, giving water and covering with a hand-glass until the cuttings have well vegetated. Shade from the mid-day sun; remove the hand-glass in Au-

gust; and remove the plants into the nursery early in November.

Soil.—The most favourable soil is a strong loam, two feet deep, on a dry subsoil, thoroughly drained, for stagnant root moisture induces canker and moss.

Planting.—The soil should be trenched, and some cultivators place immediately beneath each tree, according to the extent of its roots, chalk, stones, or brick-bats rammed so as to form a kind of pavement to direct the roots horizontally. Plant so that the roots nearest the surface are twelve inches below it.

Espaliers.—In America the apple is seldom trained as an Espalier, though they might thus be cultivated in gardens of limited extent, and in some cases serve a double purpose, affording shade and fruit. When first planted the young plant is cut down to within about a foot of the ground, and only three shoots permitted to spring from it,

Fig. 17.—(P .51.)



one of which will be the leader, and the others will form the first or lower tier of bearing branches, which are to be secured to small stakes, so as to keep them in their proper places.

The following season the upright leader must be shortened to nine inches or a foot above the two horizontal branches, and deprived of all its shoots excepting the three uppermost, which are to be treated the same as before. In this way the leading shoot is to be stopped at the requisite distance above the horizontal ones, until it has reached the height of five feet. It is then cut off, and no more allowed to grow upright, the whole strength of the tree being directed to the fruiting branches. —*Gard. Chron.*

Espalier apple trees should be at not less than twenty feet distance; but five-and-thirty feet is better, especially for trees grafted on crab or apple stocks, which are free shooters; for trees grafted on codlin and paradise stocks eighteen or twenty feet may be a sufficient distance. They should be planted with

their heads entire, only removing any very irregular growths that do not range consistent with the intended form, and pruning any broken roots. Let all the branches be trained horizontally to the right and left, an equal number on each side, all at full length, five or six inches asunder, and, according as they shoot in summer, still continue them along entire. At the same time train in a further supply of new shoots, to increase the number of horizontals or bearers, and thus continue increasing their numbers every year, till the espalier is regularly filled from the bottom to top, preserving all the branches at full length, as far as the allotted space will admit.

They must have a summer and a winter pruning annually; in the summer cut out all the superfluous and ill-placed shoots of the year, and train regular ones towards the lower parts in vacant spaces, at least to remain till winter, some of which may be then wanted to fill some unforeseen vacancy, clearing out all others at this time as

close as possible. And in winter, if any worn out or decayed parts appear, then is the time to retrench them, retaining young branches in their places, and if any vacancy occurs, retain some contiguous young shoot to fill it. Cut clean out close to the branches, still continuing all the branches, and any occasional supply of shoots, at full length, as far as their limited bounds will allow; then train the whole regularly, tying them in as straight and close to the railing as possible, about six inches asunder.

Standards, or Orchard Trees.—The standards having been trained in the nursery with tolerably good heads, they should be planted with those heads entire; if any are intended for the kitchen garden, plant them at least forty feet distance; and, for a full plantation, to form an orchard, allow thirty feet distance every way.

Trim any broken roots, but leave all the others entire.

As soon as planted, let every one be well staked, to support them firmly upright, and prevent their being disturbed in rooting by winds.

Smaller growing standards, such as codlins and dwarfs upon paradise stocks, may, if required, be planted only at twenty feet distance, though, if there is room to allow a greater distance, it will be the greater advantage.

Let them also, in future, advance with all their branches at full length, taking their own natural growth, and they will soon form numerous natural spurs in every part for bearing.

With respect to pruning these standards very little is required, probably not more than once in several years, and then only the retrenching any very irregular cross-placed bough, or reducing to order any very long rambler; or when the head is become greatly crowded and confused, to thin out some of the most irregular growth, likewise all strong shoots growing upright in the

middle of the head, and all dead wood and suckers from the stem and root.

Some persons, however, prefer more pruning, and Mr. Clarke, gardener to the Earl of Lonsdale, says, "My season for pruning commences as soon as the fruit is taken off the trees, and continues to the middle of March; during that time cut out all the ill-placed shoots, such as incline to grow towards the centre, or into each other, and leave untouched all those that stand in such a way that the tree will form a cup, or something like a well blown tulip, all the branches standing perfectly clear of each other, so that they will bear fruit on the inside, the sun and air getting to all parts of the tree alike. Keep fruit trees as low as possible; this may be done by removing a limb when it is likely to get over tall, leaving a young shoot at a proper place to succeed it. The apple is in America a hardy robust tree, and succeeds admirably throughout the middle and western states, though it were desirable it should receive more attention than is frequently bestowed on it. Its principal enemy is the "Borer," (*Saperda bivittata*), which deposits its eggs in the body of the tree near the ground. The insects perforate the wood, causing disease, and if undisturbed ultimately death. The remedy is the frequent use of pliant wire thrust into the wound, so as to pierce the grub; a mound of ashes around the trunk is beneficial—alkali being extremely offensive to insects.

For full directions as to the management of apple trees see the "*Fruit Culturist*," by Thomas. "*Fruits of America*," by Downing. "*Kenrick's Orchardist*."

APPLE-BARK BEETLE. *Bostri-chus*.

APRICOT, (*Armeniaca vulgaris*.)

Varieties.—The following list is from the catalogue of D. Landreth and Fulton, Philadelphia:—

Name.	Color. y. yellow. o. orange. r. red.	Form.	Size. M. medium. L. large.	Quality.	Season of ripening at Philad.	Remarks.
1. Roman. <i>Abricot Commun.</i> <i>Large French.</i>	y.	oblong	M.	2	Aug.	Very productive and excellent.
2. Breda. <i>Holland.</i> <i>Brussels.</i>	o.	round	M.	1	Aug.	Highly flavored, productive.
3. Large Early.	o.	oblong	L.	1	July.	Excellent.
4. Moor Park. <i>Abricot Pêche.</i> <i>De Nancy.</i>	o. r.	round	L.	1	Aug.	Considered the finest.
5. Masculine Red. <i>Early Red Masculine.</i> <i>Brown Masculine.</i>	o. r.		M.	2	July.	Earliest.
6. Orange. <i>Royal Persian.</i> <i>Early Orange.</i>	o.	round	M.	2	Aug.	Abundant bearer, good flavor.
7. Peach. <i>De Nancy.</i> <i>Latimer's Peach.</i>	o. r.	round	L.	1	Aug.	Good and productive.
8. Turkey. <i>Large Turkey.</i>	y.	round	L.	1	Aug.	

Propagation is best done by budding on a plum or peach stock in August or September, as the state of the wood may make expedient. European gardeners usually, for dwarfs, bud at eight inches from the ground; for half-standards at three feet; and for standards at five feet. But that is unimportant, the subsequent treatment of the tree may adapt it to the required purpose. With us it is the general practice to bud near the ground, and the usage would imply the practice has proved correct.

Planting.—The best plants are with one stem, free from gum, clean barked; and the more vigorous the better. They may be safely transplanted at any time in autumn after vegetation has ceased, until the buds are about to expand in spring.

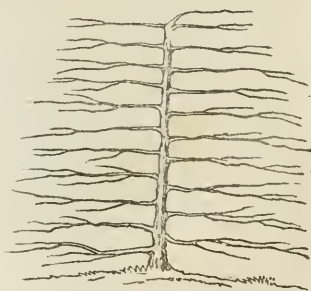
Aspect.—An eastern or western wall is best; for on a south aspect the fruit becomes mealy even before it is ripe. A northern exposure sometimes proves most successful, as the bloom is late, and escapes frost, which is fatal to those in more sheltered situations. As a standard, the apricot is some years before it bears, but it is then very prolific and high flavored.

Soil.—The usual mellow loam of gardens is well suited to the apricot;

but its roots should be kept at less than eighteen inches from the surface, and the border be well drained.

Training.—The branches should be on an average six inches apart, and kept as horizontal as possible. The nearer the form can be kept to the following (Fig. 18) the better, unless the tree be weak, in which case the

Fig. 18.



branches may be trained a little more vertical.

Pruning must be regulated by the knowledge that, with the exception of the Moor Park, each variety bears chiefly on the shoots of the previous

years. The Moor Park mostly on spurs upon two and three years' old branches.

Summer Pruning.—Take off all fore-right shoots and others that are irregular and misplaced; reserving those that are vigorous and that will train in well for next year's bearing. If done early in May the finger and thumb will supersede the knife for this pruning. Continue to nail the shoots to the wall as necessary during all the summer. Over-vigorous shoots may be topped in June, and be thus induced to put forth more fertile laterals.

Winter Pruning had best be done as soon as the leaves have fallen, though it may be carried on until the buds begin to swell in March. Cut out the most naked of the two previous years' shoots, and old branches not well supplied with young wood, to have their places re-occupied by younger and better branches. Keep a leading shoot at the end of each branch. Vigorous shoots of the last year shorten about one-eighth—weaker shoots about one-half. This promotes the production of laterals for next year's fruiting, and gives a fuller supply of sap to the blossom buds; but if the shortening is too great, the latter will be converted to leaf-buds. Cut off all fore-right spurs; but lateral spurs may be retained, as they sometimes produce blossom buds, as they always do in the Moor Park.

Espaliers are to be formed as those on walls, and standards only require dead, crowded, or chaffing branches to be removed.

When an apricot gets old and diseased, it is much more profitable to replace it by a younger, than to attempt its renovation.

Gathering should take place before the fruit is quite ripe, or it will be mealy.

Thinning, as soon as the fruit is large enough for tarts, in May or early in June, should be boldly done, no fruit being left nearer than six inches to another.

Insects.—Wasps and flies are best kept off by a net, not nearer than a foot to the wall.

Mildew is often the most formidable assailant of the apricot, as it usually arises from excess of moisture to the root; draining the border, and mixing lime with the soil, will be in such case found efficacious as a preventive, and

at the time a syringing with water containing one-eighth of gas ammoniacal liquor.

APRIL. In this fickle month the sheltering of wall fruit requires particular attention. Easterly blighting winds always prevail towards its close, and early in May.

The work required to be attended to in the various departments in the latitude of Philadelphia, is as follows. It should be performed early or later as we reside south or north of that latitude:—

KITCHEN GARDEN.

Alexanders, sow.—*Angelica*, sow.—*Artichokes*, plant, b. or dress.—*Asparagus*, sow, plant, force, and dress beds.—*Balm*, plant.—*Basil*, sow.—*Beans*, sow, hoe.—*Beets*, sow, b.—*Borecole*, sow, prick out, leave for seed.—*Brocoli*, sow.—*Borage*, sow.—*Burnets*, sow, and plant.—*Cabbages*, sow, plant.—*Capsicum*, sow.—*Cardoons*, sow.—*Carraway*, sow.—*Carrots*, sow, weed.—*Cauliflowers*, late, sow in open ground, b.—*Celery*, sow, leave for seed.—*Chamomile*, plant.—*Chives*, plant.—*Chervil*, sow, leave for seed.—*Coleworts*, plant.—*Clary*, sow.—*Cress*, sow.—*Cucumbers*, sow.—*Dill*, sow.—*Earthing-up*, attend to.—*Fennel*, sow or plant.—*Finochio*, sow.—*Garlic*, plant, b.—*Horse-radish*, plant, b.—*Hotbeds*, make and attend.—*Hyssop*, sow, plant.—*Jerusalem Artichokes*, plant, b.—*Kale* (Sea), sow and plant, b.; dress beds.—*Kidney beans* (dwarfs), sow; (runners), sow, e.—*Lavender*, plant.—*Leeks*, sow, b. e.; leave for seed.—*Lettuces*, sow weekly; plant from frames.—*Marigolds*, sow.—*Marjorams*, sow and plant.—*Melons*, sow.—*Mustard and Cress*, sow; leave for seed.—*Mushroom beds*, make; attend to.—*Mint*, plant.—*Nasturtiums*, sow.—*Onions*, sow, b. e.; weed; plant and for seed; (Potatoe and Tree), plant, b.—*Parsley*, sow; leave for seed; (Hamburg), sow.—*Parsnips*, sow, b.; hand weed.—*Peas*, sow; hoe; stick.—*Penny-royal*, plant.—*Pompions*, sow, b.—*Potatoes*, plant; attend forcing.—*Purslane*, sow.—*Radishes*, sow; thin.—*Rape*, sow.—*Rocambole*, plant.—*Rue*, plant.—*Salsafy* and *Savory*, sow, e.—*Scorzonera* and *Skirrets*, sow, e.—*Shallots* and *Sage*, plant, b.—*Sorrels*, sow and plant.—*Spinach*, sow; thin; leave for seed.—*Tansy* and *Tarragon*, plant.—*Thyme*, sow and plant.—*Tomatos*,

sow.—*Turnips*, sow, b. e.; plant and for seed.—*Turnip Cabbage*, sow.—*Wormwoods*, sow.

ORCHARD.

Apples may be planted.—*Blossoms* of wall fruit, protect.—*Budded* (Trees), last summer, remove insects from buds, and shoots from stocks below.—*Cherries* may be planted.—*Disbud* wall trees of superfluous buds.—*Forcing* fruits, in hot-house, attend to.—*Grafting* (late kinds of apples, pears, and plums), may be done still, b.—*Grafts*, lately inserted, see that the clay is firm, and rub off shoots below the scion.—*Heading down* wall and espalier trees, finish, b, if not done last month.—*Insects*, search for and destroy.—*Lime* (early in the morning), dust over the leaves of trees infested by caterpillars.—*Liquid Manure*, give to trees newly planted.—*Mulch* round the roots.—*Peaches* may be planted.—*Pears* may be planted.—*Plums* may be planted.—*Propagating* by layers, cuttings, suckers, and seed, finish, b.—*Pruning*, finish, b.; stop young shoots.—*Stake* trees newly planted.—*Strawberries*, water daily in dry weather those in bloom, if dry.—*Vines*, propagate by layers and cuttings, b.; summer dress; in vineyard stake and hoe frequently; old borders manure.—*Wall-fruit*, thin generally.—*Wasps*, destroy; every one now killed prevents a nest.

* FLOWER GARDEN.

Annuals (Tender), prick out those sown in February and March into a hot-bed; water often; sow in hotbed; (Hardy), may be sown in borders, &c., to remain; thin those advancing.—*Auriculas* in bloom, shelter. (See *Hyacinth*.) Supply with water often; those for seed plunge pots in a sheltered border, where they can have sun until eleven o'clock; plant offsets; propagate by slips; seedlings shade during mid-day.—*Anemones* and *Auriculas* done flowering, take up and separate offsets.—*Box* edgings may be made, and old taken up, slipped and replanted.—*Biennials*, finish sowing, b.; plant out those sown last spring.—*Bulbs*, in water glasses, done flowering, plant in ground after cutting down stalks; autumn flowering, take up and store, ready for planting in July; spring flowering, re-

move from borders to some place where they can complete their vegetation; their decayed leaves are unsightly.—*Carnations*, in pots, give liquid manure, and water often; stir the earth; sow, e.; plant into borders, b.—*Climbing* plants, train and regulate.—*Dahlias*, plant to remain, b., or in pots to forward in a frame until May.—*Dress* the borders, &c., indefatigably.—*Evergreens*, plant, b.; it is the best season.—*Frames*, raise, by supporters at the bottom, as the plants within grow tall.—*Roll*; trim edges; dress with earth if poor.—*Gravel*, turn and lay afresh in dry weather; roll once a week.—*Hyacinths*, shelter from sun by an awning or matting over the beds, from nine to four; give the same shelter in bad weather day and night; those done flowering take up; separate offsets and store.—*Insects*, destroy with tobacco smoke or dusting of Scotch snuff.—*Mignonette*, sow in any warm border.—*Mulch*, put round trees newly planted.—*Pinks*, sow.—*Polyanthuses*, sow; plant out and propagate by offsets, b.; last year's seedlings now in bloom, mark best for propagating.—*Potted Plants*, give fresh earth to, if not done last month; shift into larger; water freely.—*Perennials*, those sown last spring may still be planted, and propagated by offsets; finish sowing.—*Sticks* are required to blooming plants.—*Tulips*, take off pods to strengthen bulbs.—*Watering* plants in pots is now required more frequently, yet moderately; give it early in the morning.

HOT-HOUSE.

Air, admit freely during the day.—*Bark Beds*, renew if not done in March.—*Figs*, first crop ripening, require abundant light; syringe to destroy red spider; give little water, and air freely.—*Flowering Plants* in pots, for succession, continue to introduce.—*Grafting* flowering stove plants is worthy of practice, either to get dwarfs or taller specimens.—*Insects*, destroy by tobacco fumes.—*Leaves*, clean occasionally, either with the sponge or syringe.—*Liquid Manure*, apply to fruiting vines and other plants requiring vigour.—*Mushroom House*, keep air in moist; woodlice destroy.—*Orchidaceæ*, shade.—*Potted Plants*, shift into larger as required.—*Pines*, continue to treat as in March; shade during bright sun; those shifted

in that month or February shift again, e.; suckers remove; plant crowns.—*Propagate* by layers, suckers, cuttings, and seed, according to the plants' habits.—*Red Spider* is now apt to prevail; put sulphur upon the flues to drive away.—*Steam*, admit frequently into house.—*Syringe* every plant that will bear the treatment to prevent the Red Spider.—*Vines*, treat as last month; thin grapes, and tie up shoulders of the bunches; water abundantly; remove superfluous shoots, e.; temp. about 75°; in the late green-houses, train up the rafters.—*Water* requires to be given oftener; sprinkle frequently about the house, and keep the pans full.

GREEN-HOUSE.

Air, admit daily, as weather permits.—*Camellias*, sow and graft.—*Earth* in pots stir frequently; and add fresh if not done in March.—*Greenfly* or *Aphis* usually indicates the house has been kept too cold.—*Hardest Plants* keep in coldest parts of house, near the ventilators.—*Head-down* irregular growing shrubs.—*Heat*, increase if necessary.—*Inarch* shrubby exotics.—*Leaves* and *Wood* decayed, remove as they appear; clean with sponge or syringe.—*Liquid Manure* apply to sickly shrubs.—*Potted Plants*, shift as they require room; and water immediately.—*Propagate* by seeds, cuttings, inarching, and other modes, as the species permit.—*Prune* or *Pinch off* free growing shoots, to make shrubby growths.—*Succulent* plants shift; plant cuttings and suckers.—*Water* often, guided always by the plant's habits.

AQUARIUM is the place devoted to the cultivation of aquatic or water plants. The majority of those cultivated are exotic, and require the protection of glass. If there are only a few of these they may be successfully grown in cisterns placed in a stove; but if the collection be extensive, it requires a separate edifice. The tank system of heating by hot water offers a very superior mode of keeping the water at a fitting temperature. The leaden cistern in which the plants are submerged may rest readily upon the slates forming the cover of the tank.

Mr. Loudon recommends an aquarium to be thus constructed: "The cistern to be close under the front glass, and have that glass rather flat, say

at an angle of fifteen degrees, or two cisterns might be formed, one in the back part of the house for tall plants, and the other in front, for plants with floating foliage, with a broad path between. But the most elegant plan would be to have a circular house, having glass on all sides, to have a cistern in the centre for river plants, and a surrounding cistern for those which grow in stagnant water. To imitate the effect of the motion of water in the central cistern, the mould or pots in which the plants grow might be placed on a bottom, apart from that of the cistern, and this bottom being on the end of an upright shaft, might, by the aid of proper machinery in a vault below, be kept in perpetual circular motion. Those plants which grow naturally in rapid streams, might be planted or placed on the circumference of the bottom, and those requiring less agitation towards its centre. If reversed motion was required to imitate tides, (where marine aquatics were cultivated,) nothing could be easier than by the sort of wheel used in the patent mangle to produce it to any extent, or by another still more simple plan known to every engineer, it might be changed seldomer, say only once or twice in twenty-four hours. If a rapid and tortuous motion was required, then let the bottom on which the plants are placed be furnished with small circular wheels placed on its margin working on pivots, and furnished on their edges with teeth like a spur wheel. Then let there be a corresponding row of teeth fixed to the inside of the wall, or side of the cistern, into which they are to work, like a wheel and pinion.

"By this means pots of plants set on the small wheels will have a compound motion, one round the centre of the small wheels, and another round that of the large bottom, something of the nature of the planetary motion, but more like that of the waltz dance. It is almost needless to add, that exotic aquatic fowls and fishes might be kept in such an aquarium, and either of the sea or fresh water rivers, according as salt water or fresh was used. It may be thought by some that the machinery would be intricate and troublesome; but the power requisite is so very small, that it might easily be obtained by machinery on the principle of the wind-up

jack, such as is used by Deacon in his ventilating Eolians.

"This kind of mechanism very seldom goes out of order or requires repairs, and would require no other attention than being wound up twice in twenty-four hours, and oiled occasionally. The same vault that contained it might serve for the furnace or boiler for heating the house."—*Gard. Enc.*

The following are aquatic stove plants :—

Aponogeton angustifolium.

———— *distachyon*.

———— *monostachyon*.

Arum venosum.

Cyperus alternifolius.

———— *papyrus*.

Damasonium indicum.

Euryale ferox.

Menyanthes indica.

———— *ovata*.

Nelumbium speciosum.

Nymphaea cœrulea.

———— *lotus*.

———— *pubescens*.

———— *pygmæa*.

———— *rubra*.

———— *stellata*.

———— *versicolor*.

Philydrum lanuginosum.

Pontederia cordata.

———— *dilatata*.

Sagittaria lancifolia.

———— *obtusifolia*.

Thalia dealbata.

Propagation and culture.—Being all herbaceous plants, they are to be propagated as these generally are; some are raised from seeds, which, in general, should be sown as soon as ripe, and the pots plunged in shallow water; when the plants come up they may be transplanted into other pots, and shifted as they advance in growth, till in a pot of sufficient size to admit their flowering, which will generally take place the same season. Instead of being kept in pots, the plants may be inserted in a bed of earth on the bottom of the aquarium. Keep the water warm, say from 70° to 75° in summer, and leave them nearly dry in winter. *Nelumbium speciosum* requires a water heat of 84°.

Cyperus, *Papyrus*, *Nelumbium*, *Nymphaea*, *Limncharis*, *Hydrocharis*, *Sagittaria*, and *Pontederia*, will furnish variety enough.

Stove for aquatics.—For one com-

bined with the culture of ORCHIDEOUS PLANTS see the latter title.

Hardy Aquatics require an aquarium proportioned to the size of the rest of the pleasure grounds; and that its bottom be rendered retentive of water by puddling with clay. Its sides should be sloping, and cut into terraces, so as to be suited to the various heights of the plants, and its margins should be formed of rough stones and fragments of rock, among which marsh plants will grow luxuriantly.

AQUEDUCT, a conveyance of any kind for conducting water. The Romans made prodigious structures of this kind; some are still in use, others, in a state of decay, are among the greatest ornaments of Italy. In landscape gardening, the aqueduct enables the operator to produce a fine effect, where the absence of water would render the scene tame and uninteresting.

AQUILARIA malaccensis. Stove evergreen shrub. Cuttings. Loam and peat.

AQUILEGIA, Columbine. Seven-teen species, and many varieties. Hardy herbaceous. Seed. Common soil.

ARABIS. Thirty-one species, and many varieties. Hardy herbaceous and evergreen. Seeds or cuttings. Light soil.

ARACHIS hypogæa. Stove annual. Seed. Sandy loam.

ARALIA. Eighteen species. Chiefly stove evergreens, but a few hardy or green-house plants. Cuttings. Common soil.

ARAUCARIA. Three species. Coniferous green-house trees. Rich light soil. Cuttings planted in sand in August take freely. Cover with a bell-glass, and place in a cold frame or pit. Exclude frost and damp. In spring give a little bottom heat. Plants thus raised never form good leading shoots. —*Gard. Chron.*

ARBORETUM is a collection of trees and shrubs capable of enduring exposure to our climate. These are usually arranged in genera according to their precedence in the alphabet; or in groups conformably to the Jussieuan system; and whichever is adopted it is quite compatible with an attention to facility of access by means of walks, as well as to picturesque effect.

It is an evil growing out of the fre-

quent change in the ownership of estates, that most proprietors are indisposed to plant for posterity; consequently we see but few grounds laid out with a view to permanent improvement. Those who plant are anxious themselves to reap the fruits of their exertions, not knowing, and consequently careless, who shall succeed them—where landed property is, by entail, transmitted from generation to generation, family pride, and the love of distinction, ensure every improvement being made in a permanent form—thus have been created the magnificent parks of Europeans, and their stately mansions. Our American system deprives us of such monuments of taste—but we can bear the deprivation, seeing the greater good produced thereby.

ARBOUR is a seat shaded by trees. Sometimes these are trained over a wooden or iron trellis-work, mingled with the everlasting sweet pea, clematis, and other climbing odorous plants. When the trellis-work is complicated and the structure more elaborate, with a preponderance of the climbers already named, together with the honeysuckle, &c., they are described as *French* or *Italian arbours*.

ARBOR VITÆ, *Thuja*.

ARBUTUS, Strawberry tree. Fourteen species, and a few varieties. Evergreen shrubs, chiefly hardy in Great Britain, but require shelter in the Middle States. Layers, budding, inarching, and seed. Loam and peat.

ARCHANGEL, *Lamium*.

ARCHITECTURE. Rural architecture has been greatly improved within the last quarter of a century. Much greater attention is now paid to the structure of garden and farm buildings, and the domestic comfort of those employed in rural labour. There is of consequence an elevation of taste, and conduct, and beneficial results to all concerned. In England, Loudon has laboured to this end with great success, and his *Encyclopædia of Villa and Cottage Architecture*, is a monument to his industry and indomitable energy. Downing, in this country, has followed the path so plainly marked by Loudon, and produced a volume, which cannot but refine the taste, and correct much that offends the eye.

ARCTOSTAPHYLOS. Four species. Hardy trees, raised like the *Arbutus*.

ARCTOTHECA. Two species. Green-house herbaceous. Division. Loam and peat.

ARCTOTIS. Thirty-one species. Chiefly green-house evergreens. *A. virgata* is a hardy annual.

ARCUATION. The same as *LAYERING*.

ARDISIA. Twenty-five species. Stove or green-house evergreen shrubs. An ornamental genus of plants much valued by collectors for the beauty of their foliage and berries. They are of easy culture. Cuttings of branches or roots. Loam and peat.

ARDUINA *hispidosa*. Green-house evergreen shrub. Cuttings. Peat and loam.

ARECA. Ten species. Stove palms. Seeds. Sandy loam.

AREMONIA *agrimonoides*. Hardy herbaceous. Division. Common soil.

ARETHUSA. Two species. Tender orchids. Division. Moist peat and loam.

ARETIA. Five species. Hardy herbaceous. Division. Sandy loam and peat.

ARGANIA *syderoxyylon*. Stove evergreen tree. Layers or cuttings. Common soil.

ARGEMONE. Five species. Hardy plants. Suckers. Common soil.

ARGYREIA. Eight species. Stove evergreen climbers. Cuttings. Light rich soil.

ARISTEA. Five species. Green-house herbaceous. Seed or division. Loam and peat.

ARISTOLOCHIA. Thirty-six species. Hardy, green-house and stove. Several species are Americans. *A. labiosa*, from Brazil, is a very curious plant. *A. serpentaria* (the root of) is said to be the substance which the Egyptian Snake-jugglers chew for the purpose of stupefying the snakes, by the introduction of their saliva into the reptiles' mouths. Cuttings. Rich sandy loam and peat.

ARISTOTELIA *macqui*. Hardy evergreen shrub. Cuttings. Common soil.

ARMENIACA. Four species. Hardy fruit trees. Budding on plum-stocks. Rich loam. See *Apricot*.

ARMERIA. Nineteen species. Hardy herbaceous, except *A. fascicu-*

lata, which is a green-house evergreen. Division. Rich light soil. See *Thrift*.

ARNOPOGON. Four species. Hardy annuals. Seed. Common soil.

ARTABOTRYS *odoratissima*. Stove evergreen shrub. Cuttings. Sandy loam and peat.

ARTANEMA *fimbriatum*. Hardy evergreen shrub. Seed. Loam and peat.

ARTEMISIA, Wormwood. Forty-seven species. Seed. Division and cuttings. Mostly hardy and herbaceous.

ARTHROPODIUM. Five species. Green-house herbaceous. Division or seed. Sandy loam and peat.

ARTHROSTEMMA. Two species. Green-house evergreen shrubs. Cuttings. Loam and peat.

ARTICHOKE, (*Cynara scolymus*.)

Soil and situation.—The finest heads are produced in a soil abounding in moisture, but in such they will not survive the winter. To enable them to survive the winter, those for the supply of suckers, as well as those for the last-ing production, must have a rich loam allotted to them. Manure must be applied every spring; and the best compost for them is a mixture of three parts well putrefied dung, and one part of fine coal-ashes. They should always have an open exposure, and above all be free from the influence of trees; for if beneath their shade or drip, the plants spindle, and produce worthless heads.

Time and mode of planting.—It is propagated by suckers, which are annually afforded by the parent plants in the spring. These must be slipped off in March or early in April, when eight or ten inches in height, with as much of their fibrous roots pertaining as possible. Such of them should be selected as are sound and not woody. The brown hard part by which they are attached to the parent stem must be removed, and if that cuts crisp and tender, it is tough and stringy, and is worthless. Further, to prepare them for planting, the large outside leaves are taken off so low as that the heart appears above them. If they have been some time separated from the stock, or if the weather is dry, they are greatly invigorated by being set in water for three or four hours, before they are planted. They should be set in rows four feet and a half by three feet apart, and about half their length beneath the surface. Water them abundantly every

evening until they are established, as well as during the droughts of summer. The only other attention they require during the summer, is the frequent use of the hoe. They produce heads the same year, from July to October, and will continue to do so annually, from May until June or July. As often as a head is cut, the stem must be broken down close to the root, to encourage the production of suckers before the arrival of winter. In November or December, they should receive their winter's dressing. The old leaves being cut away without injuring the centre or side shoots, the ground must be dug over, and part of the soil thrown into a moderate ridge over each row, it being put close about the plants, but the hearts left clear. Each plant must be closed round with long litter, or pea haulm: it is, however, a very erroneous practice to apply stable dung immediately over the plants previous to earthing them up, as it in general induces decay. As soon as February commences, all covering of this description must be removed. In March, or as soon as the shoots appear four or five inches above the surface, the ridges thrown up in the winter must be levelled, and all the earth removed from about the stock to below the part from whence the young shoots spring. Of these remove all but two or at most three of the straightest and most vigorous, care being taken to select from those which proceed from the under part of the stock: the strong thick ones proceeding from its crown having hard woody stems, and are productive of indifferent heads.

Although the artichoke in a suitable soil is a perennial, yet after the fourth or fifth year the heads become smaller and drier. The beds, in consequence, are usually broken up after the lapse of this period, and fresh ones formed on another site.

The *artichoke's heads* are made to attain a much larger size than they would otherwise by twisting a ligature very tightly round the stem, about three inches below each, and thus preventing the reflux of the sap.

No vegetable is more benefitted than the artichoke by the application of seaweed or any other manure containing common salt.

To obtain chards.—After the best

heads have been cut, early in July the leaves are to be cut over within half a foot of the ground; and the stems as low as possible. In September or October, when the new shoots or leaves are about two feet high, they are bound close with a wreath of hay or straw, and earth or litter is drawn round the stems of the plants. The blanching is perfected in a month or six weeks. If the chards are wished late in the winter, the whole plants may be dug up before frost sets in, and laid in sand in their blanched state. In this way they may be kept for several weeks.

Gobbo.—"The stem of an artichoke is bent down to a right angle, and the petioles are collected and covered over so as to blanch. The result is a lump, which is eaten raw with salt, and is tolerably good. In Italy it is used in the autumn and winter, and replaces radishes."—*Gard. Chron.*

ARTOCARPUS. Bread Fruit Tree. Two species. Stove evergreens. Cuttings. Light rich loam.

ARUM. Thirty-seven species. Hardy, green-house, and stove. Offsets. Common soil.

ASARUM. Five species. Hardy, herbaceous. Division. Common soil.

ASCARICIDA. Two species. Stove annuals. Seed. Rich light soil.

ASCLEPIAS. Thirty-six species. Chiefly hardy, and all herbaceous but *A. Greeniana* and *Mexicana*, which are stove evergreens. Seed or division. Peat.

ASHES are the remains of a substance which has undergone combustion, and are as various in their components as are the bodies capable of being burnt. Whatever be the substance burnt, the process should be made to proceed as slowly as possible, for by such regulation more carbon or charcoal is preserved in the ashes, which is the most valuable of their constituents. The simplest mode of effecting a slow combustion is to bank it over with earth, leaving only a small orifice to admit the air sufficiently to keep up a smouldering fire.

Ashes have been usually recommended as a manure most useful to heavy soils, but this is a decided mistake. As fertilizers they are beneficial upon all soils, and they can never be applied in sufficient quantity to alter the staple of a too tenacious soil. To thirty

square yards, twenty-eight pounds is an average application, and they cannot be put on too fresh.

Peat ashes contain—

Silica	32
Sulphate of lime	12
Sulphate and muriate of soda	6
Carbonate of lime	40
Oxide of iron	3
Loss	7

They are an excellent application to lawns, turnips, cabbages, potatoes, and peas.

Coal ashes contain carbon, silica, alumina, sulphate of lime, iron and potash, carbonate of lime, and oxide of iron. They are a good manure for grass, peas and potatoes. Sprinkled half an inch deep on the surface over beans and peas, they hasten the germination of the seed, and preserve it from mice. They are also used for forming dry walks in the kitchen department.

Soap-boilers' ashes contain—

Silica	35.0
Lime	35.0
Magnesia	2.3
Alumina	1.5
Oxide of Iron	1.7
————— Manganese	1.8
Potash (combined with Silica)	0.5
Soda (Do.)	0.2
Sulphuric Acid (combined with Lime)	0.2
Phosphoric Acid (Do.)	3.5
Common salt	0.1
Carbonic Acid (combined with Lime and Magnesia)	18.2

They are good for all crops but especially grass and potatoes.

Wood ashes and the *ashes of garden weeds* generally contain silica, alumina, oxides of iron and manganese, lime, magnesia, potash, partly in the state of a silicate, soda, sulphates of potash and lime, phosphate of lime, chloride of sodium, and carbonates of lime, potash, and magnesia, with a considerable portion of charcoal. They are a good application to cabbages, potatoes, and peas.

Turf ashes contain silica, alumina, oxides of iron and manganese, lime, magnesia, sulphates of potash and lime, phosphates of lime and magnesia, common salt, and charcoal. They have been used beneficially to grass, onions, carrots, beans, potatoes, and beet root.

ASH-TREE. (*Frazines excelsior*.)

ASIATIC-POISON BULB. (*Crinum asiaticum*.)

ASIMINA. Four species. Hardy deciduous shrubs. Layers. Peat and loam.

ASPALANTHUS. Thirty-one species. Green-house evergreen shrubs. Cuttings. Sandy loam and peat.

ASPARAGUS. Twenty-eight species, of which the most important is the kitchen vegetable, *asparagus officinalis*. Of this there are only two varieties, the purple topped and the green-topped; the first is principally cultivated. There are a few sub-varieties which derive their names from the places of their growth, and are only to be distinguished for superior size or flavour, which they usually lose on removal from their native place.

Soil.—The soil best suited to this vegetable is a fresh sandy loam, made rich by the abundant addition of manure.

Situation.—The site of the beds should be such as to enjoy the influence of the sun during the whole of the day, as free as possible from the influence of trees and shrubs, and if choice is allowed, ranging east and west. The subsoil should be dry, or the bed kept so by being founded on rubbish or other material to serve as a drain. The space of ground required to be planted with this vegetable for the supply of a small family is at least eight rods. If less it will be incapable of affording one hundred heads at a time. Sixteen rods will in general afford two or three hundred every day, in the height of the season.

Time of sowing.—To raise plants, the seed may be sown from the middle of February to the beginning of April; the most usual time is about the middle of March. The best mode is to insert them by the dibble five or six inches apart, and an inch below the surface, two seeds to be put in each hole, or they may be sown in drills made the same distance asunder.

Culture in seed bed.—If dry weather, the bed should be refreshed with moderate but frequent waterings, and if sown as late as April, shade is required by means of a little haulm during the meridian of hot days, until the seeds germinate. Care must be taken to keep them free from weeds, though this operation should never commence until the plants are well above ground, which will be in the course of three or four weeks from the time of sowing. If two

plants have arisen from the same hole, the weakest must be removed as soon as that point can be well determined. Towards the end of October, as soon as the stems are completely withered, they must be cut down, and well putrefied, dung spread over the bed to the depth of about two inches; this serves not only to increase the vigour of the plants in the following year, but to preserve them during the winter from injury by the frost. About March in the next year, every other plant must be taken up and transplanted into a bed, twelve inches apart, if it is intended that they should attain another, or two years' further growth, before being finally planted out, or they may be planted immediately into the beds for production. It may be here remarked that the plants may remain one or two years in the seed bed; they will even succeed after remaining three, but if they continue four they generally fail. It is, however, certain that they are best removed when one year old.

Some gardeners judiciously sow the seed in the beds where they are to remain for production.

Time of final planting.—The best time for the final removal is the end of March, if the soil is dry, and the season warm and forward; otherwise it is better to wait until the commencement of April. A very determinate signal of the appropriate time for planting, is when the plants are beginning to grow. If moved earlier, and they have to lie torpid for two or three months, many of them die, or in general shoot up very weak.

Construction of the beds.—In forming the beds for regular production, have them three feet wide. The site of the bed being marked out, the usual practice is to trench the ground two spades deep, and then to cover it with well-rotted manure, from six to ten inches deep; the large stones being sorted out, and care taken that the dung lies at least six inches below the surface.

Mode of planting.—The plants being taken from the seed-bed carefully with a narrow-pronged dung-fork, with as little injury to the roots as possible, they must be laid separately and evenly together, for the sake of convenience whilst planting, the roots being apt to entangle and cause much trouble and injury in parting them. They should

be exposed as short a time as possible to the air, and to this end it is advisable to keep them until planted in a basket covered with a little sand. The mode of planting is to form drills or narrow trenches five or six inches deep and a foot apart, cut out with the spade, the line side of each drill being made perpendicular, and against this the plants are to be placed, with their crowns one and a half or two inches below the surface, and twelve inches asunder. The roots must be spread out wide in the form of a fan, a little earth being drawn over each to retain it in its position whilst the row is proceeded with. For the sake of convenience, one drill should be made at a time, and the plants inserted and covered completely before another is commenced. When the planting is completed, the bed is to be lightly raked over, and its outline distinctly marked out. Care must be had never to tread on the beds—they are formed narrow to render it unnecessary—for everything tending to consolidate them is injurious, as, from the length of time they have to continue, without a possibility of stirring them to any considerable depth, they have a natural tendency to have a closer texture than is beneficial to vegetation. Water must be given in dry weather daily until the plants are established. The paths between the beds are to be two and a half feet wide.

Mr. Beaton says, that “By far the best way of growing asparagus is in single rows three feet apart, and nine inches plant from plant; but if the ground is not deeper than two feet or thirty inches, or if room is scarce, the rows need not be more than thirty inches asunder.

“I have grown asparagus this way for the last fifteen years, and give them no dung in winter, merely clearing off the stalks and weeds in October, and pointing over the surface about two inches deep with a fork, and leaving it as rough as possible.

“Early in March, when the surface is quite dry, it is raked down, and about two inches of soil drawn over the crowns from each side of the rows, which gives the ground something of the appearance of a plot of peas earthed up for the first time. When the gathering is nearly over, the ground is stirred again, to loosen the tramping made in

gathering the crop. The hollow between the little ridges is then filled up with a powerful compost, consisting of equal portions of sandy soil, leaf mould, and pigeon’s dung; the whole is then drenched with liquid manure from the stables, cowhouses, or laundry, and the foreman of the kitchen garden gets *carte blanche* to water the asparagus any day through the growing season, when he can best spare his men, or at all events every fortnight, and always with liquid manure if possible. As to the quantity of water, the only instruction he gets is that he cannot drown them. This is cultivating the asparagus in summer.”—*Gard. Chron.*

Subsequent cultivation.—Throughout the year care must be taken to keep the beds clear of weeds, and in the spring and summer apply liquid manure twice a week plentifully. In the latter end of October or commencement of November, the beds are to have the winter dressing. The stalks must be cut down and cleared away, and the weeds hoed off into the paths, care being taken not to commence whilst the stems are at all green, for if they are cut down whilst in a vegetating state the roots are very prone to shoot again, and consequently are proportionably weakened.

On the richness of the ground and warmth of the season the sweetness of asparagus depends. The dung needs merely to be laid regularly over the bed, and the weeds, as well as some manure, to be slightly pointed into the paths, some of the mould from which must be spread to the depth of two inches over the dung just laid upon the beds. In the end of March, or early in April, before the plants begin to sprout, the rows are to be stirred between to a moderate depth with the asparagus fork, running it slantingly two or three inches beneath the surface, as the object is merely to stir the surface and slightly mix it with the dung.

Great care must be taken not in the least to disturb the plants. Some gardeners recommend the beds should only be hoed again, so fearful are they of the injury which may be done to the stools; but if it be done carefully, as above directed, the fork is the best implement to be employed. This course of cultivation is to be continued annually, but

with this judicious modification, that earth be never taken from the paths after the first year, but these merely be covered with dung, and which is only to be slightly dug in; for every gardener must have observed that the roots of the outer row extend into the alleys, and are consequently destroyed if they are dug over. And, rather than that should take place, the beds should have no winter covering unless earth can be obtained from some other source, as asparagus does not generally suffer from frost, as is commonly supposed.

Manuring.—No garden plant is more benefitted than is asparagus by the application of common salt, if it be given at such times as the plants are growing. Two pounds to every thirty square yards of surface should be sown broadcast over the beds early in April. After that, water the plants once a week with liquid manure, formed of half an ounce of guano and four ounces of salt to every gallon of water. The supply of food cannot be too rich or too abundant.

Spanish culture.—Near Sebastian, in Spain, the finest asparagus in Europe is produced by the following mode:—

“In March the seed is sown in two drills, about two inches deep, and eighteen inches from the alleys, thus leaving a space of two feet between the drills. The rows run invariably east and west, doubtless in order that the plants may shade the ground during the heats of summer.

“When the seedlings are about six inches high, they are thinned to something more than a foot apart. Water is conducted once a day among the alleys, and over the beds, so as to give these seedlings an abundant and constant supply of fluid during the season of their growth. This is the cultivation during the first year.

“The second year, in the month of March, the beds are covered with three or four inches of fresh night soil from the reservoirs of the town. It remains on them during the summer, and is lightly dug in during the succeeding autumn; the operation of irrigation being continued as during the first season. This excessive stimulus, and the abundant room the plants have to grow in, must necessarily make them extremely vigorous, and prepare them for the production of gigantic sprouts.

“In the third spring asparagus is fit

to cut. Doubtless all its energies are developed by the digging in of the manure in the autumn of the second year, and when it does begin to sprout, it finds its roots in contact with a soil of inexhaustible fertility.

“Previously, however, to the cutting, each bed is covered in the course of March very lightly with dead leaves, to the depth of about eight inches; and the cutting does not commence till the plants peep through this covering, when it is carefully removed from the stems, in order that the finest only may be cut, which are rendered white by their leafy covering, and succulent by the excessive richness of the soil.

“In the autumn of the third year, after the first cutting, the leaves are removed, and the beds are again dressed with fresh night soil, as before; and these operations are repeated year after year. In addition to this, the beds are half under salt water annually at spring tides.”

Time of production.—In May the beds are in full production of young shoots, which, when from two to five inches high, are fit for cutting, and as long as the head continues compact and firm. Care must be taken in cutting not to injure those buds which are generally rising from the same root in various grades of successional growth within the ground. The knife ought to be narrow pointed, the blade about nine inches in length, and saw edged. The earth being carefully opened round the shoot, to observe whether any others are arising, the blade is to be gently slipped along the stalk until it reaches its extremity, where the cut is to be made in a slanting direction. It almost always occurs that the same stool produces a greater number of small heads than large ones, but the latter only should be cut: for, the oftener the former are removed, the more numerous will they be produced, and the stools will sooner become exhausted.

“No one should cut too many sprouts from his asparagus beds. On the contrary, the gardener should take care to leave at least two or three strong sprouts, to grow from every root; or what is better, his beds should be rested one year, and cut another; for he may be certain from the strength of the summer shoots, what sort of sprouts he will have to cut the succeeding year—

remembering always that it is useless to manure asparagus beds for sprouts independently of summer shoots. If a bed of asparagus is weak, manure in the autumn will do but little for making it bring strong sprouts the next season. All that the manure can then do is to feed abundantly the summer shoots of the succeeding summer, and so enable them to prepare plenty of materials out of which a second season's strong sprouts may be pushed forth. What is true of asparagus is equally true of sea kale and rhubarb."—*Gard. Chron.*

To obtain seed.—Some shoots should be marked and left in early spring, for those which are allowed to run up after the season of cutting is over, are seldom forward enough to ripen their seeds perfectly. In choosing the shoots for this purpose, those only must be marked which are the finest, roundest, and have the closest heads; those having quick opening heads, or are small or flat, are never to be left. More are to be selected than would be necessary if each stem would assuredly be fruitful; but as some of them only bear male or unproductive blossoms, that contingency must be allowed for. Each chosen shoot must be fastened to a stake, which by keeping it in its natural position, enables the seed to ripen more perfectly.

The seed is usually ripe in September, when it must be collected and left in a tub for four or six weeks, for the pulp and husk of the berry to decay, when it may be well cleansed in water. The seeds sink to the bottom, and the refuse floats, and will pass away with the water as it is gently poured off. By two or three washings the seeds will be completely cleansed; and when perfectly dried by exposure to the sun and air, may be stored for use.

Forcing.—*Plants to be employed.*—Such plants must be inserted in hot-beds as are five or six years old, and appear of sufficient strength to produce vigorous shoots: when, however, any old natural ground plantations are intended to be broken up, at the proper season some of the best plants may be selected to be plunged in a hot-bed or any spare corner of the stove bark beds. When more than ten years old, they are scarcely worth employing. To plant old stools for the main forcing crop, is, however, decidedly erroneous; for, if

plants are past production, and unfit to remain in the garden, little can be expected from them when forced.

Time of planting.—The first plantation should be made about the latter end of September; the bed, if it works favourably, will begin to produce in the course of four or five weeks, and will continue to do so for about three; each light producing in that time 300 or 400 shoots, and affording a gathering every two or three days.

Produce.—To have a regular succession, a fresh bed must be formed every three or four weeks, the last crop to be planted in March or the early part of April; this will continue in production until the arrival of the natural ground crops. The last made beds will be in production a fortnight sooner than those made about Christmas.

Bed.—The hot-bed must be substantial, and proportioned to the size and number of the lights, and to the time of year. The common mode of making a hot-bed is usually followed. The bed must be topped with six inches of light rich earth.

Quantity necessary.—If a small family is to be supplied, three or four lights will be sufficient at a time; for a larger six or eight will not be too many. Several hundred plants may be inserted under each, as they may be crowded as close as possible together; from 500 to 900 are capable of being inserted under a three light frame, according to their size.

Mode of planting.—In planting, a furrow being drawn the whole length of the frame, against one side of it the first row or course is to be placed, the crown upright, and a little earth drawn on to the lower ends of the roots, then more plants again in the same manner, and so continued throughout, it being carefully observed to keep them all regularly about an inch below the surface; all round on the edge of the bed some moist earth must be banked close to the outside roots.

Precautions necessary.—If the bed is extensive, it will probably acquire a violent heat; the frames must therefore be continued off until it has become regular, otherwise the roots are liable to be destroyed by being, as it is technically termed, scorched or steam-scalded.

Treatment.—When the heat has be-

come regular, the frames may be set on; and more earth be applied by degrees over the crowns of the plants until it acquires a total depth of five or six inches.

The glasses must be kept open an inch or two, as long and as often as possible, without too great a reduction of temperature occurring, so as to admit air freely and give vent to the vapours; for on this depends the superiority in flavour and appearance of the shoots. The heat must be kept up by a lining of hot dung, and by covering the glasses every night with mats, &c.

The temperature at night should never be below 50°, and in the day its maximum at 62°.

Gathering.—In gathering, for which the shoots are fit when from two to five inches in height, the finger and thumb must be thrust down into the earth and the stem broken off at the bottom.

Insects.—The foliage of this vegetable is liable to be destroyed by the larvæ of two beetles, the *Lema asparagi*, or Asparagus Beetle, and the *Lema duodecim punctata*. The only remedy is to pick off and destroy the affected branches.

ASPASIA. Two species. Stove epiphytes. Bulbs. Peat and potsherds.

ASPEN, (*Populus tremula*.)

ASPERULA, Woodroof. Twenty-four species. Hardy herbaceous, except *A. brevifolia*, which is a half-hardy evergreen. Division. Moist shaded soil.

ASPHODELUS. Asphodel. Twelve species. Hardy bulbs, except *A. clavatus* and *intermedia*. Offsets. Common soil.

ASPIDISTRA. Two species. Stove herbaceous. Suckers. Common soil. Flowers produced under ground.

ASPIDIUM. Forty-nine species. Ferns. Hardy, green-house or stove. Seed or division. Loam and peat.

ASPIDIOTUS. See *Coccus*.

ASPLENIUM. Forty-nine species. Ferns. Hardy, green-house or stove. Seed or division. Loam and peat.

ASSONIA. Two species. Stove evergreen trees. Cuttings. Sandy loam.

ASTARTEA fascicularis. Greenhouse evergreen shrub. Cuttings. Sandy loam and peat.

ASTELMA. Ten species. Greenhouse evergreen shrubs. Seed or cuttings. Sandy peat.

ASTEPHANUS. Two species. Green-house evergreen twiners. Division. Peat and loam.

ASTER. One hundred and fifty-two species. Chiefly hardy, but a few green-house plants. Suckers or division. Common soil. The time for thus propagating them is in autumn, or early spring; but many of the species are increased by cuttings of the flower stalks, planted in a shady border during May or June. The varieties are numerous.

ASTEROCEPHALUS. Fifty-three species. Mostly hardy annuals and perennials. Seed or cuttings. Common soil.

ASTILBE decandra. Hardy herbaceous. Division. Peat.

ASTRAGALUS. One hundred and eleven species. Nearly all hardy perennials and annuals; the first propagated by division, the second by seed. Common soil.

ASTRANTIA. Six species. Hardy herbaceous. Division. Common light soil.

ASTRAPÆA. Three species. Stove evergreen trees. Cuttings. Rich light soil.

ASTROCARYUM. Five species. Palms. Stove. Seed. Rich loam.

ASTROLOBIUM. Four species. Hardy annuals. Seed. Common soil.

ASTROLOMA. Two species. Greenhouse evergreen shrubs. Cuttings. Sandy loam and peat.

ASTYRIA rosea. Stove shrub. Cuttings. Sandy loam.

ATALANTIA monophylla. Stove evergreen shrub. Cuttings. Rich loam.

ATAMASCO-LILY (*Zephyranthes Atamasco*).

ATHALIA spinarum. Turnip Saw-fly, known popularly as the Black-caterpillar, Black-canker, Black-palmer, Negro, &c.

Mr. Curtis observes, that "As early as May, or sooner, the Saw-flies make their appearance; the female lays her eggs on the under surface along the margin of the leaf. These hatch in about five days, and produce the Negroes, which are not thicker than a fine thread, and white, but after changing their skins, they become black, and eventually are three-quarters of an inch long, when they are more of a lead colour and yellowish-white be-

neath their skins, being very much wrinkled; they erect their tails whilst feeding, and are stretched out at full length in repose, or lie sleeping coiled up on the leaf; they are feeding about three weeks, after which they descend to the ground, and enter the earth, where they form a cocoon, silvery inside, in which the larva eventually becomes a pupa. In summer they remain only three weeks in this quiescent state, but the autumnal ones lie buried through the winter."—*Gard. Chron.* Hand-picking is the only mode of removing the caterpillars.

ATHANASIA. Seventeen species. Green-house evergreen shrubs. Cuttings. Sandy loam.

ATHEROSPERMA moschata. Green-house evergreen tree. Cuttings. Loam and peat.

ATHRIXIA capensis. Green-house evergreen shrub. Cuttings. Light loam.

ATRAGENE. Five species. Hardy deciduous climbers. Cuttings. Common soil.

ATRIPLEX. Three species. See *Orach*.

ATTALEA. Seven species. Palms. Stove. Seed. Rich loam.

AUBRIETIA. Three species. Hardy evergreen trailers. Division and cuttings. Light soil.

AUCUBA japonica. Evergreen shrub, hardy in the middle states on light dry soil. The leaves, if exposed to the sun during winter, are liable to injury. Cuttings. Common soil.

AUDISERTIA incana. Hardy evergreen shrub. Seed. Common soil.

AUDOUINIA capitata. Green-house evergreen shrub. Cuttings. Sandy peat.

AUGUST. This is a glorious month in the middle states; towards its close the extreme heat of summer has subsided, the mornings and evenings are cool and pleasant; the luscious peach, and pears, and plums are in full season, and one really feels as if he could compromise for August the year round.

The various departments now require the following work to be attended to:—the directions for the kitchen garden are specially intended for the middle portion of the Union.

KITCHEN GARDEN.

Alexanders, sow.—*Angelica*, sow.—

Aromatic Herbs may still be planted; gather for drying and distilling.—*Artichokes*, break down, &c.—*Asparagus-beds*, weed.—*Balm*, plant; gather for drying.—*Borage*, sow.—*Borecole*, plant.—*Brocoli*, plant, b.—*Cabbages*, plant out.—*Cardoons*, earth up.—*Cauliflowers*, late, plant.—*Celeriac*, earth up.—*Celery*, plant.—*Chervil*, sow.—*Coleworts*, sow for, b.; plant.—*Corn Salad*, sow.—*Cress*, sow.—*Cucumbers*, plant or sow, b.—*Dill* is fit for gathering.—*Earthing-up*, attend to.—*Endive*, plant; blanch, &c., the advancing crops.—*Fennel*, sow and plant.—*Finochio*, earth up.—*Garlic*, take up.—*Hoeing*, attend to.—*Kidney Beans*, sow, b.—*Leeks*, plant, b.—*Lettuces*, sow, plant out.—*Melons*, attend to.—*Mint*, gather for drying.—*Mushroom-beds*, make; attend to.—*Nasturtium Berries*, gather.—*Onions*, gather.—*Parsley*, sow, b.—*Peas*, sow, b.—*Radishes*, sow; gather pods for pickling.—*Rape* (edible rooted), sow.—*Rochambole*, take up.—*Seeds*, gather as ripe.—*Shallots*, take up.—*Small Salading*, sow.—*Spinach*, sow.—*Stir* between plants in rows, &c.—*Turnips*, sow at intervals, throughout the month, &c.—*Turnip-Cabbage*, plant.—*Weeding and Watering*, attend to.—*Wormwood*, plant, b.—*Tomatatos*, plant for late crop.

ORCHARD.

Budding, done in July; loosen the bandages, if on more than three weeks; remove shoots from stocks; budding may be done in most fruit, b.—*Fig Trees*, train in closely to let the fruit have the full benefit of the sun; but do not prune. *Nectarines*, look over; remove useless shoots; train in close; water plentifully or the fruit will drop. *Nets*, spread over fruit to protect it from birds.—*Peaches*.—*Vines*, look over again and clear from useless shoots, &c. *Wasps*, destroy by luring them into bottles.

FLOWER GARDEN.

Anemones, sow.—*Annuals*, stick; water; clear from decayed leaves, &c. *Auriculas*, shift into fresh earth; water; keep in the shade; seedlings prick out; sow.—*Biennial* seedlings, transplant. *Bulbous-rooted* flower-seeds, to obtain varieties, sow.—*Bulbous* roots, remove or transplant; remove and plant offsets; (Autumn flowering), plant.—*Carnation*,

layers cut from old root and plant; water frequently; layering may still be done, b.; card the flowers and shade from sun.—*Dahlias*, stake; thin the flowers.—*Daisies*, propagate.—*Double*, blossomed perennials with fibrous roots, propagate by division, e.—*Dress* borders as required.—*Edgings* of box, &c., clip in wet weather.—*Evergreens* may be moved, e., if wet weather; plant cuttings.—*Grass*, mow and roll weekly.—*Grass seeds* may be sown, e.—*Gravel*, weed and roll weekly.—*Hedges*, clip in moist weather.—*Mignonette*, sow.—*Pelargoniums*, propagate by cuttings, b.—*Perennials*, in pots and elsewhere, will require water almost daily; break down flower stalks as they finish blooming; seedlings, transplant.—*Pipings* of Pinks may be planted out.—*Polyanthuses*, sow.—*Potted Annuals* will require water daily in dry weather.—*Ranunculuses*, sow; plant in pots to bloom in November.—*Seeds*, gather as they ripen.—*Sowings*, to obtain varieties, had better be done in boxes.—*Ten-week Stock*, sow, b.—*Tulips*, and other bulbous-rooted flower-seed, sow.—*Turf*, may be laid, e.—*Watering* will be required generally in dry weather.—*Weeding*, generally attend to.

HOT-HOUSE.

Air, admit freely every day.—*Bark-beds*, stir and add fresh.—*Bulbous-rooted Plants*, force plants in pots; they will be much stronger than if done in the next month.—*Check* plants growing too freely, by removing them to cooler situations.—*Cuttings* of succulents, and some others, may be planted, b.—*Dress* the plants, by removing all decayed parts, weeds, &c., and stirring the soil as appears necessary.—*Grafting* of *Ipomæas*, and some other sorts, may be practised.—*Pines*, finish shifting, b.; water frequently; and shade until well established, then give liquid manure weekly; plant crowns and suckers as required; day temp. 85°; night 60°.—*Shifting*, wherever necessary, complete b.; especially the orchideous plants.—*Suckers*, offsets, &c., may yet be planted.—*Vines*; remove damaged grapes from bunches as they appear; give liquid manure to those beginning to ripen.—*Water*, give freely every second day.

GREEN-HOUSE.

Aloes, propagate by slips, suckers,

&c., b.—*Budding*, finish, b.—*Dress* every plant as occasion offers.—*Earth*, give to Oranges, &c.; stir the surface frequently.—*Oranges, Lemons, &c.*, bud, b.—*Peat-mould plants*, especially heaths, keep assiduously supplied with water.—*Potted Plants*, continue outside the house until the end of the month.—*Seedlings*, transplant singly.—*Shifting* into larger pots, finish.—*Succulent Plants*, as *Aloes*, &c., propagate by slips, &c., b.—*Water* freely and daily in dry weather.

AULAX. Two species. Green-house evergreen shrubs. Cuttings. Sand and a little loam.

AURICULA. (*Primula Auricula*.) This is a popular Florist's flower, and animated contests take place for the premiums annually offered by the English provincial Horticultural Societies.

Varieties.—Mr. Slater, Florist, of Cheetham Hill, Manchester, says, "For an amateur's first collection, procure of *Green-edged*: Rider's Waterloo; Pollitt's Standard of England and Highland Laddie; Ollier's Lady Anne Wilbraham; Oliver's Lovely Anne; shown also in *grey-edged* class. *Grey-edged*: Grimes Privateer; Kenyon's Ringleader; Waris Union; Sykes Complete; Thompson's Revenge. *White-edged*: Taylor's Glory; Leigh's Bright Venus; Taylor's Favourite; Kenyon's Lord Chancellor; Leigh's Pillar of Beauty. *Selfs*: Grimes, Hovas, Flag; Berry's Lord Primate; Whittaker's True Blue. *Alpines*: Emmerson's Favourite; Fieldhouse's Fair Rosamond.

2d. "As an addition to his collection, obtain of *Green-edged*: Booth's Freedom; Leigh's Colonel Taylor; Yates's Morris; Green Hero; Page's Champion; Ashton's Prince of Wales; Clough's Dolittle; Barlow's King; Litton's Imperator; Howard's Nelson; Pearson's Badajos; Pollitt's Ruler of England; Buckley's Jolly Tar; Faulkner's Ne Plus Ultra. *Grey-edged*: Fletcher's, Mary Anne, and Ne Plus Ultra; Waterhouse's Conqueror of Europe; Thompson's Bang-up; Taylor's Ploughboy; Pearson's Liberty; Howard's Sweepstake; shown also in *green-edged* class. *White-edged*: Ashworth's Rule All and Regular; Taylor's Incomparable; Wood's Delight; Popplewell's Conqueror; Potts' Regulator; Ashton's Bonny Lass; Cheetham's Countess of Wilton. *Alpines*: King of the Alps;

Queen Victoria; Conspicuous; Rising Sun; Fair Helen; Kettleby's True Blue. *Selfs*: Redmayn's Metropolitan; Netherwood's Othello; Berry's Lord Lee; Clegg's Blue Bonnet; Kay's Jupiter; Kenyon's Freedom; Gorton's Stadtholder, (*yellow*); Hulton's Squire Munday. Lastly, these are worthy of a place in any collection. *Green-edged*: Hopworth's Robin Hood; Moore's Jubilee; Lightbody's Star of Bethlehem; Stretch's Alexander. *Grey-edged*: Atcherley's Alpine Shepherdess; Metcalfe's Lancashire Hero; Ashworth's Newton Hero; Simpson's Lord of Hallamshire; Kent's Queen Victoria. *White-edged*: Lily of the Valley; Wild's Bright Phæbus; Leigh's Earl Grosvenor. *Selfs*: Oddie's Rest, Goldfinch, (*yellow*); Faulkner's Hannibal; Bradshaw's Tidy. I ought to have stated that the amateur's first collection comprises such as are not high priced, and yet good; but it must not be forgotten that the second addition contains all the first-rate varieties in cultivation, with very few exceptions."—*Gard. Chron.*

Characteristics of excellence.—"In its general appearance, the foliage should be well grown and healthy, covering a space about equal to double the width of the head of bloom. The stem should be firm, erect, and sufficiently strong to support the truss without assistance, and to carry it well above the foliage. The foot-stalks of the pip should be strong and of such a length as will allow the flowers to open without one overlaying another, the whole forming a compact globular head of well expanded flowers equal in size and similar in properties.

"The addition of one or two guard-leaves, standing up at the back of the truss, gives a finish to the whole, and adds considerably to its beauty by the contrast they form with the vivid and lively appearance of the flowers.

"The qualities which the individual pip should possess consist in its being perfectly round, flat and smooth on the edge; the divisions which form the segments of the corolla should be but slightly indented, thereby rendering the circles more perfect.

"The tube or centre must be round, of a yellow colour, filled with the anthers or thrum.

"The eye or paste round the tube

should form a perfect circle of a dense pure white, clean on its edges, even, and free from blemishes.

"The band of colour surrounding the eye should be dark, rich, or bright, joining the margin with a feathery edge, equally distributed all round, but never encroaching so much upon the edge as to pass through to the rim.

"The margin or outer edge must be of a permanent green or grey colour. The circles which compose the face of the pip are considered of the finest proportion when they are of a uniform width, that of each circle being half the diameter of the tube."—*Gard. Chron.*

Propagation is effected by taking slips from and dividing roots of approved varieties, after the seed has ripened in July and August.

Diseases.—The auricula is liable to have its roots ulcerated or cankered if the pots are not well drained. This is best done by having the pots one-fourth filled with rubbly charcoal, and the soil not too much divested of pebbles. At the blooming time the aphid or greenfly sometimes attacks the plants; these can only be removed individually by means of a camel's-hair pencil.

AVENUE, is a road bordered by trees on each side, and being, as observed by Whately, confined to one termination, and excluding every view on the sides, has a tedious sameness throughout; to be great it must be dull, and the object to which it is appropriated is after all seldom shown to advantage. Buildings in general do not appear so large, and are not so beautiful when looked at in front, as when they are seen from an angular situation, which commands two sides at once, and throws them both in perspective; but a winding lateral approach is free from these objections, it may besides be brought up to the house without disturbing any of the views from it, but an avenue cuts the scenery directly in two, and reduces all the prospect to a narrow vista. A mere line of perspective, be the extent what it may, will seldom compensate for the loss of that space which it divides, and of the parts which it conceals. These kind of walks were formerly much more the fashion than they are at present: where they are to be made, the common elm answers very well for the purpose in most grounds, except such as are very wet and shallow, and pre-

ferred to most other trees, because it bears cutting, heading, or lopping in any manner. The rough Dutch elm is approved by some because of its quick growth, and it is a tree that will not only bear removing very well, but that is green in the spring almost as soon as any plant whatever, and continues so equally long. It makes an incomparable hedge, and is preferable to all other trees for lofty espaliers. The lime is very useful on account of its regular growth and fine shade, and the horse-chestnut is proper for such places as are not too much exposed to rough winds. The common chestnut does very well in a good soil, or on warm gravels, as it rises to a considerable height, when planted somewhat close; but when it stands singly it is rather inclined to spread than grow tall. The beech naturally grows well with us in its wild state, but it is less to be chosen for avenues than others, because it does not bear transplanting well. The abele may also be employed for this use, as it is adapted to almost any soil, and is the quickest grower of any forest tree. It seldom fails in transplanting, and succeeds very well in wet soils, in which the others are apt to suffer. The oak is but seldom used for avenues, because of its slow growth; it would, however, compensate by its permanence and beauty. The sugar maple, tulip poplar, oriental and native buttonwood are all well adapted to the purpose.

AVERRHOA. Two species. Stove evergreen shrubs. Cuttings. Sandy loam.

AVERUNCATOR, or pole pruning shears. The Averuncator, attached to a pole, operates by means of a lever moved by a cord and pulley; its use is to prune from the ground trees whose branches are beyond reach. Branches of one inch and a half in diameter may be easily cut off with this instrument. Averuncators of small size, are also very useful in cutting off from shade and fruit trees small branches to which insects have attached themselves: they are also used for gathering fine fruits, which when cut fall into a basket, to be attached to the instrument when used for this purpose.

Fig. 20 is a very effective instrument of a similar kind, and has the advantage of a sliding cut, which lessens the labour of pruning, and leaves the branch which

has been cut as smooth as though a knife had been used; this instrument is superior to Fig. 19 in this respect, but will not cut a branch of greater diameter than one inch.

Fig. 19.

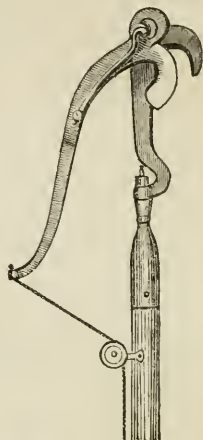
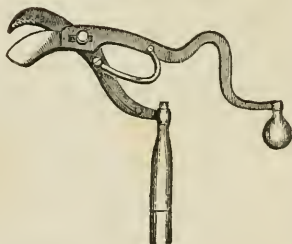


Fig. 20.



AVIARY. This building, devoted to the rearing of birds distinguished for the beauty either of their notes or plumage, is rarely admitted within a garden, and still more rarely are they sufficiently ornamental or sufficiently free from disagreeables to be a source of pleasure.

AYENIA. Two species. Stove evergreens. Cuttings. Rich loam.

AZALEA. Sixty species, and many varieties. The North American are hardy and deciduous, and the Chinese or Indian are green-house evergreens. Cuttings. Sandy peat and loam.

Mr. James Falconer, of Cheam, gives the following excellent directions for

cultivating the varieties of *Azalea Indica*.

Soil.—"The soil best adapted for their growth is a peaty earth found on commons where heath abounds, of a light fibrous texture, and containing a good portion of sand. It should be pared off from three inches to four inches deep, the turves should be spread bottom upwards, and exposed to the sun during summer, and after having a few showers of rain upon it to restore it to a proper degree of moisture, it may be laid up in narrow ridges in the autumn; it can then be taken to the potting-shed as required. When used, it should be broken or separated with a trowel, and not sifted, rejecting the undecayed surface; and for the strong-growing varieties, to six-eighths of peat and one-eighth loam; and one-eighth silver sand.

Sowing.—The Indian Azaleas ripen their seed in February, which should be sown about the beginning of March in pots with ample drainage, and a larger portion of silver sand mixed with the peat. The pot should be filled to within half an inch of the top, and pressed evenly and firmly down with the bottom of another.

"The seed should then be sown regularly over the surface, and after being covered sufficiently deep with peat, again pressed down, so that, after being watered, the seed may remain buried. The pots should be placed on a shelf in the green-house, and shaded from the direct rays of the sun.

"It is better that the seeds should vegetate by the increasing heat of the spring than by artificial means, since they will come up stronger, and are not so liable to damp off. They may be pricked out into other pots as soon as they have made two or three leaves, and as they advance in growth they may be potted into thumbs, or small sixties, in which they may remain in winter.

Culture.—About the beginning of March those which are intended for specimens should be put into a house at a temperature of from 45° to 50°, where they will soon be excited to grow. If in sixty or forty sized pots, they should be shifted into sizes larger; but it is better to do this when the plants are in a growing state. They should then be shaded for a few days, and when the flower is shut up in the afternoon, gently syringed.

"Many varieties will throw up three or four stems; the strongest should be selected for a leader. When growing, they should have plenty of air and light, without being exposed to a cold current, which is so frequently prejudicial to young plants in the spring, when clear sunshine and cold winds prevail. As they will be required to grow as late in the autumn as the weather will permit without applying fire-heat, and as it is not desirable that they should form flower-buds this season, those which want pot-room should be again shifted about the latter end of July. Great care should be taken that they are not over-potted, and that they have sufficient drainage; elevating the collar of the stem considerably, by rounding the upper side of the ball, but not so as to injure the tender and delicate fibres. The azalea is liable to canker from the water remaining too long about the collar; therefore, in watering, the spout of the pot should never be applied to it, as the cold current of water frequently repeated will check the flow of sap, and ultimately cause death.

"They should be placed at the back of the green-house during the winter, as near the glass as convenient, to ripen the wood.

"In the following spring they should be subjected to the same treatment, and again shifted into larger pots.—About the latter end of July they will have the afternoon sun. Free from the drip of trees and protected from high winds, the plants will now be of sufficient size to bloom, and in September will have formed their flower-buds.

"When out of doors they should be occasionally syringed overhead in very dry weather, and the ground around them frequently stirred and watered.

"About the middle of December, two or three varieties should be put into a forcing-house, ranging from 50° to 65°; these will begin to bloom about the latter end of January, after which they should be removed to the green-house or conservatory, to which they will give much brilliancy, and in mild weather impart a mild perfume. About a week before the first have expanded their blossoms, another succession should be put in, selecting those which from the enlargement of their buds give evidence of their susceptibility of excitement; observing that the more va-

rious the colour of the flower, the better effect will be produced in the green-house. It is a safe rule to keep up for a succession three or four varieties, to be put into heat as above stated, once a month, until the season is so far advanced that the flowers are bursting in the cool house.

"They should then be taken into heat, by which means the flower will be larger, the colours more brilliant, and their fragrance more delightful. Every means should be adopted to prevent the attacks of the humble bee, as every blossom in which it inserts its proboscis will fall off in a few hours afterwards.

"When the large specimen plants have done flowering, all the seed vessels should be picked off, leaving such as are intended for seed. They should be then shifted and encouraged to grow; afterwards placing them out of doors, as before stated.

"Great care should be taken at all times to keep them free from insects, as they are liable to be attacked by a species of thrips, for which the best remedy is a strong fumigation of tobacco. The varieties *Variegata* and *Lateritia*, are early excited in the spring; but are nevertheless the latest bloomers; they will make stronger and finer specimens by being inarched on the most robust stocks.

"If after they have made their autumnal growth they should not have formed flower-buds, by placing them in a stove in a strong moist heat, until they have again burst into leaf, and then removing them to a cold green-house, the excitement produced will frequently cause them to set their flower-buds."—*Gard. Chron.* Our own native varieties have been sadly overlooked in the search for foreign beauty—those from the far south are equally hardy with those of the middle states, and are readily cultivated; the varieties are numerous, and embrace almost every shade of colour, including pure white, from light yellow to brilliant flame; they thrive better partially screened from the sun's rays, and demand a peculiar soil easily compounded by a mixture of surface earth from woodland, and decomposed turf or grass sods, in about equal proportions. The two earliest collections of this splendid shrub were made at the Bartram Botanic Gardens, and the Landreth Nurseries,

where, it is probable, the finest specimens in a cultivated state still exist.

A Z A R A. Two species. Green-house evergreen shrubs. Cuttings.—Sandy loam.

AZOREAN FENNEL. See *Finochio*.

B A B I A N A. Eighteen species. Green-house bulbs. Offsets or seeds. Sand, loam and peat.

B A C A Z I A *spinosa*. Green-house evergreen shrub. Cuttings. Peat and loam.

BACCHARIS. Ploughman's Spikenard. Twelve species. Chiefly stove and green-house evergreen shrubs. *B. glomeriflora* and *halimifolia* are hardy deciduous. Cuttings. Loam and peat.

BACTRIS. Seven species. Palms. Stove. Seed. Sandy loam.

BADGER'S BANE, *Aconitum meloc-tonum*.

BÆCKIA. Nine species. Green-house evergreen shrubs. Cuttings.—Loam and peat.

BAKING is a term descriptive of the hard impervious state of clayey soils, long exposed to drought. It can be prevented only by altering the staple of the soil, by the admixture of sand, chalk, coal-ashes, and other less cohesive matters than clay.

BALANTIUM *culcita*. Stove fern. Division. Peat and loam.

BALM (*Melissa officinalis*).

Soil and situation.—The soil best suited to its growth, is any poor and friable, but rather inclining to clayey than silicious. Manure is never required. An eastern aspect is best for it.

Time and mode of planting.—It is propagated by offsets of the roots, and by slips of the young shoots. The first mode may be practised any time during the spring and autumn, but the latter only during May or June. If offsets are employed, they may be planted at once where they are to remain, at ten or twelve inches; but if by slips, they must be inserted in a shady border, to be thence removed, in September or October, to where they are to remain. At every removal water must be given, if dry weather, and until they are established. During the summer they require only to be kept clear of weeds. In October the old beds require to be dressed, their decayed leaves and stalks cleared away, and the soil loosened by the hoe or slight digging.

Old beds may be gathered from in July, for drying, but their green leaves from March and September, and those planted in spring, will even afford a gathering in the autumn of the same year. For drying, the stalks are cut with their full clothing of leaves to the very bottom, and the process completed gradually in the shade.

BALM OF GILEAD. Several plants are popularly known under this name. "The Balm of Gilead of commerce is the dried juice of a low tree or shrub (*amyris gileadensis*), which grows in several parts of Abyssinia and Syria. This tree has spreading, crooked branches; small, bright-green leaves, growing in threes; and small, white flowers on separate footstalks. The petals are four in number, and the fruit is a small, egg-shaped berry, containing a smooth nut. By the inhabitants of Syria and Egypt, this balsam, as appears from the Scriptures, was in great esteem from the highest periods of antiquity. We are informed by Josephus, the Jewish historian, that the balsam of Gilead was one of the trees which was given by the queen of Sheba to king Solomon. The Ishmaelitic merchants, who were the purchasers of Joseph, are said to have been traveling from Gilcad, on the eastern side of Canaan, to Egypt, and to have had their camels laden with 'spicery, balm and myrrh.' It was then, and is still, considered one of the most valuable medicines that the inhabitants of those countries possess. The virtues, however, which have been ascribed to it exceed all rational bounds of credibility. The mode in which it is obtained is described by Mr. Bruce. The bark of the tree is cut with an axe, at a time when its juices are in their strongest circulation. These, as they ooze through the wound, are received into small earthen bottles; and every day's produce is gathered, and poured into a larger bottle, which is closely corked. When the juice first issues from the wound, it is of a light-yellow colour, and a somewhat turbid appearance; but, as it settles, it becomes clear, has the colour of honey, and appears more fixed and heavy than at first. Its smell, when fresh, is exquisitely fragrant, strongly pungent, not much unlike that of volatile salts; but if the bottle be left uncorked, it soon loses this quality. Its taste is bitter, acid,

aromatic and astringent. The quantity of balsam yielded by one tree never exceeds 60 drops in a day. Hence its scarcity is such, that the genuine balsam is seldom exported as an article of commerce. Even at Constantinople, the centre of trade of those countries, it cannot, without great difficulty, be procured. In Turkey, it is in high esteem as a medicine, an odoriferous unguent and a cosmetic. But its stimulating properties upon the skin are such, that the face of a person unaccustomed to use it becomes red and swollen after its application, and continues so for some days. The Turks also take it in small quantities, in water, to fortify the stomach."—*Encyc. Am.*

BALSAM or LADIES' SLIPPERS (*Impatiens triflora*). The cultivation of this common yet beautiful half hardy annual is so thoroughly understood, as not to require remark farther than "we believe it to be true, that old seeds produce finer balsams under equal circumstances than new seeds; and the reason is thought to be, that the plants raised from old seeds are not so vigorous as others."—*Gard. Chron.*

BALSAM APPLE. *Momordica balsamina*.

BALSAMINA. Balsam. Eleven species. Green-house annuals. Seeds. Light rich loamy soil.

BALSAMODENDRON *zeylanicum*. Stove evergreen tree. Cuttings. Sandy loam and peat.

BALSAM-TREE. *Clusia*.

BANANA-TREE. *Musa Sapientum*.

BANE-BERRY. *Actæa*.

BANNISTERIA. Thirteen species. Chiefly stove evergreen twining plants. Cuttings. Loam and sandy peat.

BANKS (*sloping*), says Mr. Barnes, "Are of great advantage in bringing forth vegetation of all kinds at an early season in a healthy state, and in the greatest abundance. Another great advantage is their forming a boundary and shelter to the valleys, borders, or slips between them, dividing the quarters into any desired portions, for the succession of all vegetable crops, salads, &c. By cropping both sides, the season of the different articles is prolonged, and through their being placed in such a healthy situation, I find I can always secure abundance of salads, lettuce, endive, radishes, cauliflower, and cab-

bage-plants. The first early cabbage and peas I have planted in these sloping banks with great advantage. The winter endive being cleared and the slopes forked, a situation is provided for the first out-door crops of carrots, turnips, radishes, &c. The slopes that are next cleared in succession make provision for the early dwarf kinds of French beans on the south side; and late planted Windsor or other kinds of late beans are planted on the north side, which is found a good situation for them; besides forming a shelter to the others by breaking the cold winds. Others are cropped with strawberries on both sides. The slopes that are cleared latest in the spring, are cropped with late cauliflower, with the first planting of early Cape broccoli on the north side, and succession of other vegetables are kept up throughout the season. By constantly keeping the surface stirred, the crops are all to be seen in a healthy state, progressing admirably in favourable weather throughout the winter months, and indeed, the whole season through.

"The advantage of forming sloping banks do not end in that derived from the variation of aspect, the healthiness and the prolongation of the crops, and in securing shelter; but there is a still greater advantage, by gaining a considerable extent of surface; thus, with one acre of land with a flat surface, it is an easy matter to increase it one-half, by the sloping bank system."—*Gard. Journ.*

BANKSIA. Forty-two species. Green-house evergreen shrubs, except *B. verticillata*, which is a tree. Ripe cuttings or seeds. Sandy peat.

BAOBAB-TREE. *Adansonia*.

BAPTISIA. Ten species. Hardy herbaceous plants. Divisions. Common loamy soil.

BARBACENIA *squamata*. Stove herbaceous. Cuttings. Sandy loam.

BARBADOES CEDAR. *Juniperus barbadensis*.

BARBADOES CHERRY. *Malpighia*.

BARBADOES GOOSEBERRY. *Perezkia*.

BARBADOES LILY. *Amaryllis equestris*.

BARBAREA, Winter cress. Seven species. Hardy herbaceous plants. Division. Common soil.

BARBERRY (*Berberis vulgaris*). There are five varieties of this elegant shrub—the red, without and with stones; the black sweet, which is tender, and requires a sheltered border; the purple, and the white.

Propagation. Suckers, cuttings, and layers may be employed either in the spring or autumn. The seed is very rarely used.

Soil.—A sandy, or calcareous soil, with a dry subsoil, suits it best.

Culture.—It requires no other pruning than such as is necessary to keep it within bounds.

Fruit.—This is fully ripe in October, and is gathered in entire bunches for preserving, pickling, and candying.

Diseases.—It is liable to be infected with a parasitical fungus, once believed to be the same as that which is known as the mildew on wheat, but they are now known to be different species. That which preys upon the Barberry is *Puccinia*, and that which attacks Wheat is *Uredo*. Consequently the old popular opinion among farmers, that the mildew on wheat originated on and was propagated by the Barberry, has exploded.

BARBIERIA *polyphylla*. Stove evergreen shrub. Cuttings. Sandy peat.

BARK.—The refuse bark from the tanner's yard is employed by the gardener as a source of heat, and when thoroughly broken down by putrefaction, as a manure.

As a source of heat, it is much less used than formerly, flues, steam, and the hot water system having very generally and most deservedly superseded it. Bark for heating requires frequent stirring and renewing, and if too much moisture be added, is apt to give out an excessive and irregular heat. In addition, it is a troublesome harbour for predatory insects.

Bark fresh from the tan-yard being thrown lightly together under a shed, must be gently moistened if dry, and turned over twice a week, to expose all its particles to the air. Unless this be done, the fermentation will not be general or regular. This is to be continued for a month or five weeks, in warm weather the shorter time being requisite, and then, having acquired a general and equal heat, it is ready for use in the stove. Usually it will continue to afford heat for a period varying between three and six months, but

sometimes ceases to ferment without any apparent cause. Whenever the heat declines, the tan must be taken out, sifted, the dusty parts removed, and some fresh tan added. Sometimes turning the old tan and moistening it will be sufficient.

It is desirable, on the first formation of a bed, to mix new and old tan together, in which case the quantity of new bark to be brought into the pit will depend upon the goodness of the bark, and the bottom heat required. As much new tan as will fill two third parts of the bark-pit, with a mixture of old rotten, reduced almost to earth, will produce a bottom heat of about 85°; when old tan with higher remains of strength is used to modify the new, the same heat may be produced if the quantity be not more than half the capacity of the pit. This refers to a new pit; after a bark bed has been in action, partial renewals of bark to keep up the heat are frequently sufficient in the reduced proportion of one-third, one-sixth, one-twelfth, or less. At intermediate stages between the partial renewals, the bed requires only to be excited to a brisker fermentation by forking up. About five-sevenths of the pit from the bottom should be occupied by the new and old tan as a fermenting body; and about two-sevenths from the top, or a little more than the depth of the pot, whatever that may be, should consist of old tan incapable of heating, so as to burn the roots of the plants; as least such should be the ordinary distribution of the tan; but where peculiar circumstances require a speedy augmentation of heat without displacing the pots, and when fruit is to be swelled off in the last stage, the earthy tan at top may be taken away, and new tan substituted.—(*Abercrombie.*)

As a manure. See *vegetable matters.*

BARK-BOUND.—When a tree is affected with this disease, cracks will appear in it partially, and in the case of the Cherry, Apricot, Peach, and Nectarine, gummy exudations will follow. It is a sure indication that either the soil is too rich, or not sufficiently drained; the latter is usually the source of the evil, causing a repletion of the interior vessels which the dry cuticle cannot expand sufficiently quickly to accommodate. Under-draining, and scrubbing the stem with brine or soft soap, speed-

ily effects a cure. Scoring the bark lengthwise with a knife is a usual remedy, and generally effects the purpose.

BARKING IRONS, or *Bark Scalers*, are for scraping off the indurated epidermis, or dry scales, from the stems and branches of trees.

BARK STOVE, or *Moist Stove*, is a hot-house which, either by having a mass of fermenting matter, or an open reservoir of hot water within side, has its atmosphere constantly saturated with moisture, congenially with the habits of some tropical plants. It received the name of Bark Stove, because tanner's bark was formerly a chief source of heat employed. (See *Stove.*)

BARKERIA. Two species. Stove epiphytes. Division. Peat and potsherds, or wood.

BARLERIA. Fourteen species. Stove evergreen shrubs, except *B. longifolia*, which is biennial. Cuttings. Loam and peat.

BARNADESIA rosea. Stove evergreen shrub. Cuttings. Rich loam.

BARNADIA scilloides. Half hardy bulbous plants. Offsets. Peat and loam.

BAROMETER.—Mr. P. Christensen, of Cowes, in the Isle of Wight, Lecturer upon Astronomy, &c., has arranged a table, which no one having a weather-glass should be without. This "Companion to the Barometer" is the result of thirty-two years' observation, and the following is an epitome of the information it gives. During the first six months of the year, when the mercury is *rising*, if the weather has been bad, and the mercury reaches to 29.62 inches, there will be a change; if to 30.12, the weather will be fair; if to 30.29, set fair. If the mercury has been high, and begins *falling*, there will be a change if it declines to 29.90; rain, if it descends to 29.50; and wind, with rain, if it reaches 29.12.

During the last six months of the year, if the weather has been foul, and the mercury begins *rising*, there will be a change if it reaches to 29.48; fair if to 30.13; and set fair if to 30.45. If the weather has been fair, and the mercury begins *falling*, there will be a change if it sinks to 29.87; rain, if to 29.55; and wind with rain, if to 29.28. At any time of the year, if the mercury fall to 28.10, or even to 28.20, there will be stormy weather. These conclusions are from observations made at thirty feet above

the sea's level, and therefore one one-hundredth part of an inch must be added to the height of the mercury for every additional ten feet above the sea's level, where the barometer may happen to be.

BARREN PLANTS. The male flowers of the cucumber, melon, and other monoecious plants, are popularly known as *barren* flowers; and the plants of the asparagus, mercury, and other dioecious plants bearing only male plants, are usually termed barren. These are naturally unfruitful; but there is also a barrenness arising from disease or other consequences of bad cultivation. If a tree, or any other plant, does not yield the desired produce of fruit of which it is capable, the gardener may be assured that the soil, or the want of drainage, or the manuring, or the pruning, is injurious. Even a *blind* or barren cabbage may be made productive; for its barrenness arises from the central bud being abortive, and it will produce lateral buds, if all but one leaf and the place of the abortive bud be cut away.

Temperature has a great influence over the sex of the flowers produced by a given plant. A very high temperature caused a water-melon to bear male blossoms only; and a very low temperature made cucumber plants yield female flowers alone. Mr. Knight had little doubt that the same fruit stalks might be made, in the plants just noticed, to support flowers of either sex in obedience to external causes.

BARREN SOIL. No soil is absolutely incapable of production; and when it is spoken of as being barren, no more is meant than that in its present state it will not repay the cultivator. The unproductiveness arises from a deficiency of some of the earths; from an excess or deficiency of animal and vegetable matters; or from an excess of stagnant water. No soil can be productive where nineteen parts out of twenty are of any one earth or other substance. If either chalk, or sand, or clay, be in excess, the remedy is found in adding one or both of the other two. An excess of organic matter only occurs in peat soils, and these are reclaimed by draining, paring, and burning, and the addition of earthy matter; drainage is also the cure for an excess of water.

BARRINGTONIA speciosa. Stove evergreen tree. Cuttings. Loam and peat.

BARTHOLINA pectinata. Terrestrial orchid. Offsets. Sandy loam and peat.

BARTON, Benjamin S., M. D., Professor in the University of Pennsylvania. Born at Lancaster, Pa., 1766. Died Dec., 1815. In 1789 appointed Professor of Natural History and Botany in the College of Philadelphia. His chief publication is *Elements of Zoology and Botany*.

BARTONIA. Four species. Hardy annuals and biennials. Seed. Sandy loam.

BARTRAM, John, one of the most distinguished of American botanists, was born in Chester county, Pennsylvania, in 1701. His grandfather, of the same name, accompanied William Penn to this country, in 1682.—B. was a simple farmer. He cultivated the ground for subsistence, while he indulged an insatiable appetite for botany. He was self-taught in that science, and in the rudiments of the learned languages, and medicine and surgery. So great, in the end, was his proficiency in his favourite pursuit, that Linnæus pronounced him "the greatest natural botanist in the world." He made excursions, in the intervals of agricultural labour, to Florida and Canada, herborizing with intense zeal and delight. At the age of 70, he performed a journey to East Florida, to explore its natural productions; at a period, too, when the toils and dangers of such an expedition far exceeded those of any similar one which could be undertaken, at the present time, within the limits of the U. States. He first formed a botanic garden in America, for the cultivation of American plants, as well as exotics. This garden, which is situated on the banks of the Schuylkill, a few miles from Philadelphia, still bears his name. He contributed much to the gardens of Europe, and corresponded with the most distinguished naturalists of that quarter of the globe. Several foreign societies and academies bestowed their honours upon him, and published communications from him in their transactions. B. died in 1777, in the 76th year of his age. At the time of his death he held the office of American botanist to George III. of England. He was amia-

ble and charitable, and of the strictest probity and temperance.

BARTRAM, William, fourth son of John B., was born, 1739, at the botanic garden, Kingessing, Pennsylvania. At the age of 16 years, he was placed with a respectable merchant of Philadelphia, with whom he continued six years; after which he went to North Carolina, with a view of doing business there as a merchant; but, being ardently attached to the study of botany, he relinquished his mercantile pursuits, and accompanied his father in a journey into East Florida, to explore the natural productions of that country; after which he settled on the river St. John's, in this region, and finally returned, about the year 1771, to his father's residence. In 1773, at the request of Dr. Fothergill, of London, he embarked for Charleston, to examine the natural productions of the Floridas, and the western parts of Carolina and Georgia, chiefly in the vegetable kingdom. In this employment he was engaged nearly five years, and made numerous contributions to the natural history of the country through which he travelled. His collections and drawings were forwarded to Doctor Fothergill; and, about the year 1790, he published an account of his travels and discoveries, in 1 vol. 8vo., with an account of the manners and customs of the Creeks, Cherokees, and Choctaws. This work soon acquired extensive popularity, and is still frequently consulted.—After his return from his travels, he devoted himself to science, and, in 1782, was elected Professor of Botany in the University of Pennsylvania, which post he declined, in consequence of the state of his health. In 1786, he was elected a member of the American Philosophical Society, and was a member of several other learned societies in Europe and America. We are indebted to him for the knowledge of many curious and beautiful plants peculiar to North America, and for the most complete and correct table of American ornithology, before the work of Wilson, who was assisted by him in the commencement of his American Ornithology. He wrote an article on the natural history of a plant a few minutes before his death, which happened suddenly, by the rupture of a blood vessel in the lungs, July 22, 1823, in the 85th year of his age.

BARYOSMA. Six species. Green-house evergreen shrubs. Cuttings. Peat and sand.

BASELLA. Eight species. Stove biennial climbers chiefly. Seed. Rich light soil.

BASIL. (*Ocymum*.) There are two kinds, the Sweet-scented (*O. basilicum*), and the Dwarf-bush (*O. minimum*).

Soil and situation.—They thrive most in a rich light soil, entirely free from any overshadowing body; but they require, especially for the earliest plants, a sheltered border.

Time and mode of sowing.—They are propagated by seed, which may be sown in a gentle hot-bed, with the shelter of a frame at the close of March, or early in April; to be thinned, and those removed pricked out at the close of this latter month in a similar situation, to be finally removed in the course of May or commencement of June, when settled weather, in the open ground. This sowing may be repeated at the close of April, or beginning of May, on a warm border, to be pricked and finally planted out, after a lapse of about five weeks respectively between each operation.

When thinned, the seedlings must be left at three inches apart, and those removed pricked out at a similar distance. The final planting must be made in rows a foot apart each way. Some plants of all the sowing may be left where raised, to be gathered from whilst young. Water must be given at every removal, as well as during every stage of their growth, when dry weather occurs. Weeds must be kept under, as well as the plants benefited by frequent hoeing.

The young leaf tops are the parts made use of in soups and salads, their flavour resembling that of cloves.

The supply is never failing during summer, as they shoot out rapidly for successive supplies.

To obtain seed.—Some of the earliest raised plants must be left ungathered from. These flower from July to September, and accordingly ripen their seed in early or late autumn.

BASKETS employed by the London gardeners, being made of osier or deal shavings, vary triflingly in size more than measures made of less flexible materials. They are as follows:—

Sea kale punnets—eight inches diameter at the top, and seven inches and a half at the bottom, and two inches deep.

Radish punnets—eight inches diameter, and one inch deep, if to hold six hands; or nine inches by one inch for twelve hands.

Mushroom punnets—seven inches by one inch.

Saladings punnets—five inches by two inches.

Half sieve—contains three imperial gallons and a half. It averages twelve inches and a half diameter, and six inches in depth.

Sieve—contains seven imperial gallons. Diameter, fifteen inches; depth, eight inches.

Bushel sieve—ten imperial gallons and a half. Diameter at top, seventeen inches and three quarters; at bottom, seventeen inches; depth, eleven inches and a quarter.

Bushel basket—ought, when heaped, to contain an imperial bushel. Diameter at bottom ten inches; at top, fourteen inches and a half; depth, seventeen inches. Walnuts, nuts, apples, and potatoes are sold by this measure. A bushel of the last-named, cleaned, weighs fifty-six pounds, but four pounds additional are allowed if they are not washed.

There is one description of Basket of which we think the Londoners know but little. We allude to the *Peach Basket!* It would excite no ordinary commotion were one of our noble steamboats to ascend the Thames, laden with a thousand or more baskets, each containing a bushel of ripe luscious peaches, which are frequently sold in Philadelphia at twenty-five cents the basket. Yet such is the sight which may be seen (in fruitful seasons) on the Delaware every day in August.

BASS, or BAST MATS. These are chiefly made in Russia, from the inner bark of trees (*bast* in the Russ language). Their best use is as a packing envelope, for as a protection to wall trees they are inferior to netting; and to standard shrubs, structures made of straw (see *Shelters*) are to be preferred. They are very serviceable, however, to place over beds of early spring radishes, &c., to prevent the night radiation. This is quite as effectual, much cleaner, and less troublesome than a covering of straw. The strands of these mats are used by Nurserymen as binding, when budding or engrafting, and are the best adapted to the purpose of any material

known. Where it is not obtainable, coarse loosely spun cotton or woollen yarn, is a good substitute.

BASSIA. Three species. Stove evergreen trees. Cuttings. Sandy loam and peat.

BASTARD ACACIA. *Robinia pseudo-acacia.*

BASTARD ACMELLA. *Spilanthes pseudo-acmella.*

BASTARD CABBAGE TREE. *Geoffroya.*

BASTARD CEDAR, *Guazuma.*

BASTARD CHERRY. *Cerasus pseudo-cerasus.*

BASTARD CINNAMON. *Cinnamomum cassia.*

BASTARD CORK TREE. *Quercus pseudo-suber.*

BASTARD DICTAMNUS. *Beringeria pseudo-dictamnus.*

BASTARD HARE'S EAR. *Phyllis.*

BASTARD JASMINE. *Androsace chamaejasme.*

BASTARD ALBIA. *Lavatera pseudo-albia.*

BASTARD QUINCE. *Pyrus chamaemespilus.*

BASTARD WIND-FLOWER. *Gentiana pseudo-pneumonanthe.*

BATATAS. Twelve species. Chiefly stove deciduous climbers. Young cuttings. Light rich soil.

BATEMANNIA *Collegi.* Stove epiphyte. Bulbs. Peat and potsherds.

BATSCHIA. Four species. Hardy herbaceous. Seeds and division. Common soil.

BAUERA. Two species. Greenhouse evergreen shrubs. Cuttings. Sand and peat.

BAUHINIA. Forty-six species. Stove evergreen shrubs or climbers. Cuttings. Sandy loam and peat.

BAY TREE, *Laurus nobilis,* will resist the winter nearly as far north as Philadelphia, on light soils. Its aromatic leaves render it an agreeable inmate of the garden.

BEAD TREE. *Melia.*

BEAN. *Vicia faba,* of *Linnaeus.* *Fève de marais, Fr.* *Bohn, Ger.* *Fava, Ital.* *Habas, Spn.* "Of the above kind, commonly called in this country 'Horse Bean,' there is considerable variety; two of them have been selected by us for cultivation, believing them the best adapted for the climate, and quite sufficient of the kind. They are the Early Long Pod and Broad Windsor. Both

succeed with the same treatment, but the first named is the more certain bearer of the two. In England, where they are extensively cultivated, they do much better than in this country, preferring its damp, cool atmosphere, to our frequently dry and hot one; to counteract which it is desirable to plant as early in the spring, as the ground will admit of being worked—in the latitude of Philadelphia (39° 57' N.) the latter part of February, or beginning of March, if possible; they then come into flower before the weather becomes hot, otherwise the blossoms drop, and set no fruit.

“Plant them in drills, either single or double, two inches apart in the drills, and cover one to two inches deep. If in double drills, with alleys two and a half feet wide. If in single rows, two feet alleys answer, unless it be intended to cultivate them with the horse hoe, as is done by market gardeners.

“Those who are particularly fond of this bean, can accelerate the crop by setting a frame at the close of winter, under the lee of a board fence, or other protected situation, exposed to the sun, which cover with glass, and in severe weather with matting or straw, so as effectually to exclude the frost. Herein plant the beans, one seed to the square inch, and let them remain, until the arrival of milder weather, when they should be transplanted to the position in the garden which it is intended they shall occupy. In transplanting them, care should be taken not to injure the roots, to guard against which, use a trowel to ease them up, and suffer as much earth as will to adhere. During the time they remain in the frame, the sash should be raised when the weather is mild, to admit the air, and gradually harden them, preparatory to full exposure when transplanted, else the sudden change of temperature might prove fatal. In order to make them set fruit more certainly, it is the practice to nip off the top of leading shoots when they are in full flower; this checks the growth, and directs the strength of the plant towards the blossoms. If a part of the flowers are destroyed in this operation, there is no loss.

“Whilst the crop is growing and progressing towards maturity, keep the ground well hoed, and freed from weeds. When the plants have attained

six or eight inches in height, draw towards, their base a portion of loose earth, which will encourage them to put forth fresh fibres, and protect the roots already formed, from the sun's rays.”—*Rural Register*.

B E A N S, *Kidney*. *Haricot*, *Fr.* *Schminckbohne*, *Ger.* *Judias*, *Span.* *Faguiolo*, *Ital.*—“Of the Snap-Short Bean, the Haricot of the French, the varieties and sub-varieties are numerous. The Early Mohawk or Brown Six Weeks arrives soonest at perfection, and is the hardiest of the early ones; the Early Yellow, Red Speckled Valentine, and China Red Eye, immediately succeed. The Red French is about the latest: other varieties ripen promiscuously. All the kinds are brought to the Philadelphia market; some purchasers preferring one, and others another. The Red Speckled Valentine is a variety very generally admired; it is round podded, without strings, an abundant bearer, and remains tender longer than most others. The Brown Valentine or Refugee is an excellent variety, as is also the China Red Eye. The pods of the Red French are used as well for pickling as boiling, and the beans throughout the winter in a dry state, as haricots, and in soups, for which it is usually preferred.

“The usual plan of cultivating this tribe is in drills, double or single, two inches apart in the drills; two to two and a half feet should be allowed between the drills. They are much more tender than the Long Pod or Windsor, and will not succeed, if planted before the weather has become somewhat settled, and the earth warm; in the latitude of Philadelphia, not earlier than April, unless in very dry ground, and protected situations. To have a constant supply, it will be necessary to plant successive crops at intervals of two or three weeks, which is much preferable to planting but seldom, and then a larger quantity. Plantations made so late as 1st August generally succeed and yield abundantly.

“When they have risen three or four inches, give them a careful hoeing, to destroy all weeds, and loosen the earth. At this time, or shortly after, draw towards the base of the plants some of the loose soil, to the depth of one or two inches. This process is termed ‘*landing*,’ and is highly beneficial in

protecting the roots from excessive drought, and the direct rays of the sun. As the crop approaches maturity, nothing more is required than an occasional hoeing, observing always to keep the ground free from weeds.

"In selecting a spot to plant beans, choose where the soil is light and tolerably dry. If it be poor, apply a good dressing of well rotted manure, either spread over the entire surface, or placed the drills when drawn out."—*Rural Reg.*

BEANS, Pole.—"The **SCARLET RUNNERS**, and **WHITE DUTCH BEANS**, are very delicately flavored, and are used either in the pod, or shelled when further advanced; but in Pennsylvania, and perhaps farther south, they bear so sparingly most seasons, as to be scarcely worth cultivating.

"The **LIMA** is too well known to need description. Two varieties are cultivated; the one broad and thin, the other much thicker. We have sometimes thought the latter the more tender and delicate when boiled. The Lima Bean is very tender, not bearing the slightest frost, and is very subject to rot when planted early, or during a spell of rainy or damp, cool weather. To guard against this, the best plan is to sprout them in a frame, (as recommended for the Long Pod or Windsor,) so situated that the damp and frost can be excluded. An old hot-bed answers the purpose effectually. They need not be planted therein before the middle of spring, nor transplanted till towards its close; a little earlier or later as the weather may make expedient; if planted early, they will at best remain stationary, and may, perhaps, perish. They should be planted in hills in well cultivated ground, dressed either in the piece or hills, with thoroughly rotted manure, from the barn-yard. The hills should be raised three or four inches above the average level, and be three feet apart each way, with a pole six or eight feet high, well secured in the ground, to each hill. Three plants in a hill are sufficient. As the vines shoot up, they should be tied to the poles, till they get hold, when they will support themselves. In tying them, observe to do it in the direction in which they incline to clasp the pole, which is contrary to the course of the sun, and opposed to the habit of most climbers.

"Those who have not the convenience

of a frame, (or hand-glass, which will answer the same purpose,) should have the hills prepared and poles inserted, choosing a mild, dry time, about the close of May, for planting the beans. If wet weather should immediately succeed, and the seed rot, replant as soon as the ground dries. Good crops have been produced in the vicinity of Philadelphia, when planted even so late as first of June.

"After they become well established, and have clasped the poles, no further care is requisite, other than keeping the weeds under, and the hills occasionally stirred.

"The **CAROLINA** or **SEWEE** bean, is of a smaller size than the Lima; much hardier, rather earlier, and more productive, but generally considered less rich. In other respects they closely resemble each other—time of planting may be a little in advance of the Lima—cultivation precisely the same."—*Rural Register.*

BEAN-CAPER. *Tyrophylum.*

BEARS-BANE. *Aconitum theropodum.*

BEAR-BIND. *Calystegia.*

BEARS-BREECH. *Acanthus.*

BEARS-GRAPE. *Arctostaphylos uva-ursi.*

BEAUFORTIA. Five species. Green-house evergreen shrubs. Cuttings. Sandy loam and peat.

BEAUMONTIA. Two species. Stove evergreen twiners. Cuttings and seed. Loam and peat.

BECIUM bicolor. Green-house shrub. Cuttings. Sandy loam.*

BED is a comprehensive word, applicable to the site on which any cultivated plants are grown. It is most correctly confined to narrow divisions, purposely restricted in breadth for the convenience of hand weeding or other requisite culture.

BEDDING-IN. See *Sowing.*

BEDDING-OUT, is removing plants from the pots in which they have been raised, into the beds which they are intended to adorn during summer and autumn. Mr. Threlkeld gives this judicious advice upon the practice. If the season be dry, in the bottom of the hole made for the plant put some rotten dung, or other material that will retain water; water this well, plant, fill the hole to within two inches of the surface, add more water, and then fill up

the hole. If water is necessary afterwards, hoe the beds when dry enough. Damp the leaves, if no appearance of dew.—*Gard. Chron.* The following are good plants for bedding out in masses:—For large beds, Pelargoniums, especially the scarlet, Fuchsias and Penstemon gentianoides coccineus. For smaller beds, Petunia superba, beauty, and splendens; Gailardia picta; Enothera Drummondii; Verbena astrosanguinea, Bishopii, Taglionii, and Queen; and Lobelia splendens.

BEDEGUAR. See *Cynips Rosæ*.

BEE, (Apis.) All the species of this insect are friendly to the gardener, for they all aid in impregnating his flowers, many of which without their aid would fall unproductive of either fruit or seed. The honey bee (*A. mellifica*) is the most active in this operation; but the humble bee (*Bombus apis*), and others of the robust species, are very valuable, being able to visit flowers in rough weather, when the honey bee will not venture from its hive.

BEECH. *Fagus.*

BEEF. *Betterave, Fr. Rothe Rübe, Ger. Acelgas, Span. Barba Bieltola, Ital.* “The Red Beet is a native of the sea-coast of the south of Europe. It was cultivated in England in 1656, and then called *beet rave*, (or beet-radish,) from the French name, *betterave*.

“The long red or blood, is generally used for the winter supply, and the extra early, and early turnip-rooted, for the summer. The extra early turnip-rooted has been lately introduced from Italy—its growth is astonishingly rapid; it should always be planted for the first crop, and the old turnip-rooted to succeed.

“There are several other kinds cultivated, but the foregoing are the best known; and being both early and late, are beyond question amply sufficient.

“*White Beet.* This is a hardy biennial plant, with leaves larger than the red beet, and very thick and succulent. It is a native of the sea coasts of Spain and Portugal. “It is cultivated in gardens entirely for the leaves, which are boiled as spinnage, or put in soups. Those of the great white, or sweet beet, are esteemed for the mid ribs and stalks, which are separated from the lamina of the leaf, and stewed and eaten as asparagus, under the name of ehard.” The great white, or Swiss chard, has been

introduced into this country within a few years; those who have cultivated it give it a high character, and consider it fully equal to asparagus.

“The *Mangold Wurtzel* is principally grown for stock. It is, however, very early, rapid in its growth, and tolerably good for table use when young and tender. It might, therefore, be an object with such as are particularly fond of beets, to sow a small quantity of this species for an early crop. As food for stock, especially milch cows, it is scarcely surpassed, and the product is enormous.

“*Silesian or Sugar.*—The Sugar Beet has had great popularity as food for stock, and though not now as generally grown by our farmers as formerly, has many advocates who claim for it great merit, and attribute the failure of others to injudicious feeding. They argue that roots, during cold weather, should only be given in moderate quantities, and always with a little bran or meal;—that the cows should be fed in comfortable quarters. Such treatment, it is contended, will produce satisfactory results, which could hardly be expected from roots frequently given in a frozen state, the animal exposed to the cold, and without anything to counteract the scouring tendency of the roots.

“All Beets do best when planted in rows, as they then admit of hoeing and more thorough cleaning. The rows twelve or fourteen inches apart, the plants in the rows not nearer than four inches. It is advisable to sow the seed thicker than that, and when the plants are two inches high, thin them to the proper distance.

“The seed is usually sown in a shallow drill, drawn by the hoe, and covered to the depth of an inch. For the early crops plant early in spring, on a warm sheltered border. The commencement of summer is sufficiently early to sow those intended for the winter supply. Should the weather be dry when about to sow at that season, pour scalding water on the seed, and let them soak 24 to 48 hours, and roll in the seed.

“The Beet requires rich ground, and like all tap-rooted plants, delights in a deep loose soil. Throughout their growth they demand occasional hoeing between the rows, and freedom from weeds.

"In farm culture, sow in drills three feet apart, so as to admit the horse-hoe—deep tillage produces its beneficial effects on this crop as on most others.

"To save them during the winter, they should be placed in the cellar, against the wall, in tiers, tops outward, with alternate layers of sand or earth. Or in hills in the garden, with a covering of earth two to three feet thick; the aperture at which they are taken out as required, being carefully closed with straw; for, should hard frost reach them, they will decay."—*Rural Reg.*

BEGONIA. Fifty-eight species. Chiefly stove evergreens. Cuttings. Rich loam.

BEJARIA. Two species. Green-house evergreen shrubs. Cuttings. Loam and peat.

BELLADONNA LILY. *Amaryllis Belladonna.*

BELLEISLE CRESS. *Barbarea precox.* See *American Cress.*

BELLEVALIA Operculata. Hardy bulb. Suckers. Common light soil.

BELL FLOWER. *Campanula.*

BELL-GLASS, is so called from its usual form being that of a bell. It is formed of one entire piece of glass, and of common bottle glass when intended for sheltering cauliflowers, &c., in the open borders; but of white glass for preserving moisture to cuttings in the hot-house.

BELLIDIATRUM Michellii. Hardy herbaceous plant. Division. Peat and loam.

BELLIS. Daisy. Five species. Hardy herbaceous perennials, except *B. annuala*, which is an annual. Division. Common soil.

BELLIUM. Four species. Hardy plants. Seeds or division. Sandy peat.

BELLOWS are employed for fumi-gating, differing only from the common bellows by having a receptacle for ignited tobacco in the pipe of its nozzle, through which the air, being gently forced in the usual way, propels the smoke in any desired direction, where the insects to be destroyed appear.

BELOPERONE oblongata. Stove evergreen shrub. Cuttings. Peat and loam.

BENGAL QUINCE. *Agle Marmelos.*

BENJAMIN TREE. *Ficus Benjamina.*

BENJAMIN TREE. *Laurus Benzoin.*

BENTHAMIA fragifera. Hardy evergreen shrub. Seeds or layers. Common loamy soil.

BERARDIA. Two species. Green-house evergreen shrubs. Division. Common soil.

BERBERIS. Thirty-three species. Hardy evergreen or deciduous shrubs. Cuttings or layers. Light common soil. See *Barberry.*

BERCKHEYA. Ten species. Chiefly green-house evergreen shrubs. Cuttings. Loam and peat.

BERINGERIA. Eight species. Chiefly hardy herbaceous perennials. Division. Common soil.

BERRYA amornilla. Stove evergreen tree. Cuttings. Rich loam and peat.

BERTEROA. Three species. Hardy. Seeds or cuttings. Sandy soil.

BERTHOLLETIA excelsa. Brazil Nut. Stove evergreen tree. Cuttings. Sand, peat, and loam.

BERZELIA. Two species. Green-house evergreen shrubs. Cuttings. Sandy peat and loam.

BESLERIA. Twelve species. Chiefly stove evergreen shrubs. *B. cristata*, *B. serrulata*, *B. violacea* are climbers. Cuttings. Very light rich soil.

BESOM, or Broom, received its second name from being often made of the Broom plant; but the best, both for flexibility and durability, are made of the ling or heath. Birch brooms are the most common, and whatever the material, they will endure much longer if soaked in water for some time before using. If kept constantly in water they would be still less brittle. Where walks are liable to become mossy, a broom made of wire is frequently employed for sweeping them. If the wire be iron, it ought to be well dried and dipped in oil after being used, or it is soon destroyed by the rust.

BESSERA. Two species. Green-house bulbous perennials. Offsets. Peat and sand.

BETA. Beet. Seven species. Hardy biennials. *B. trigyna* is an herbaceous perennial. Seeds. Rich mould.

BETEL NUT. *Piper Bette.*

BETONICA. Betony. Ten species. Hardy herbaceous perennials. Suckers. Common garden soil.

BETONY. *Betonica.*

BETONY. *Teucrium betonicum.*

BETULA. Birch. Twenty-two spe-

cies. Chiefly hardy deciduous trees and shrubs. *B. carpinifolia*, *B. pontica*, *B. populifolia*, are evergreens. Grafting or budding, and layers for the dwarf species. Common garden soil.

BIBIO marci, St. Mark's Fly, of which Mr. Curtis gives the following particulars:—

The larvæ of this insect are generally gregarious, living in large groups of a hundred or more in strawberry-beds, vine borders, flower pots, and similar undisturbed spots, feeding upon the roots, and sometimes destroying the entire plant. Bouché says they completely demolished his bed of Ranunculus for several successive years, by eating up the tubers. The larva is of a dark brown colour, somewhat cylindrical, the belly flattened, moderately broad, and nearly linear; the head is comparatively small, deep brown, sometimes of a chestnut colour, and very shining; they change to pupæ generally towards the end of March; these are of a pale ochreous colour, the head being brighter.

The female lays her eggs in the earth, and in the dung of horses and cows, in May; they do not hatch until August.—*Gard. Chron.*

BIDENS. Fourteen species. Chiefly hardy plants. Seeds, suckers, division, according to their habit and duration. Common soil.

BIENNIAL, is a plant which, being produced from seed in one year, perfects its seed and dies during the year following. Biennials may often be made to endure longer if prevented ripening their seeds, and many exotics, biennials in their native climes, are perennials in our stoves.

Hardy Biennials.—Some of these ripen their seeds as early as August, in which case they may be sown as soon as harvested. Others ripening their seeds later must have these reserved from sowing until May. The double varieties of wall-flowers, stocks, &c., are propagated by cuttings.

Frame Biennials.—These required the shelter of a frame during the early stages of their growth; to be removed thence in May to the borders, where they bloom in July and August.

BIFRENARIA. Three species. Stove epiphytes. Division.

BIGNONIA. Sixty-one species. Chiefly stove evergreen climbers. *B.*

capreolata is hardy, and *B. carolina*, *B. picta*, and *B. jasminoides*, are greenhouse climbers. *B. grandiflora* bears some resemblance to our native *crucigera*, but is far more desirable: its showy flowers are borne in large racemes, which expand in succession, and thus continue in bloom for many weeks; it is from China, but quite hardy at Philadelphia; and from its rapid growth admirably adapted for walls, arbours, pillars, &c. Cuttings. Loam and peat. *B. venusta* is cultivated as follows by Mr. Brown, gardener to Lord Southampton, at Whittlebury Lodge.

The situation in which it most delights is a dark bed, where the roots can run at liberty among the tan; train upright until it reaches the top lights, then train along the house. Towards the end of December, cut the plant into six or ten feet, when it remains dormant through the winter. In the beginning of March, young shoots in abundance break from the apparently dead wood; a sufficient number of these to be trained along the house, and these again produce laterals; and at the end of each a cluster of blossom buds is formed. On the production of these lateral shoots depends the free blooming of the plant, to encourage which a damp atmosphere is to be kept by pouring water over the pathways, and by frequently syringing the plant. All superfluous shoots are stopped; and it is necessary to pay a good deal of attention to this, for an over abundance of shoots would soon be produced that would form a complete thicket. The plant commences flowering about the beginning of September.—*Gard. Chron.*

BILBERRY. *Vaccinium myrtillus*.

BILIMBI TREE. *Averrhoa bilimbi*.

BILL (Fig. 21), a sharp-edged tool, employed in cutting hedges, sharpening stakes, &c. It should never be used in pruning valuable trees; but where the branch is too strong to be cut with the knife, the saw ought always to be applied.

Fig. 21.



BILLARDIERA. Six species. Greenhouse evergreen climbers. Cuttings. Rich loam and peat.

BILLBERGIA. Ten species. Stove epiphytes. Suckers. Rich mould.

BILLOTIA acerosa. Green-house evergreen shrub. Cuttings. Sandy peat.

BINDWEED. *Convolvulus.*

BINDWEED. *Smilax Aspera.*

BIOPHYTUM sensitivum. Hardy annual. Seeds. Common soil.

BIRCH. *Betula.*

BIRCH. *Carpinus Betulus.*

BIRDS are benefactors as well as injurers of the gardener. They destroy millions of grubs, caterpillars, and aphides, which would have ravaged his crops; but at the same time they commit sad havoc upon his fruit and seeds. The wisest course, consequently, is to scare them from the garden at such times, or from the portions of it in which they can be prejudicial, but to leave them to visit it unmolested whenever and wherever they cannot be mischievous. Thus in early spring a boy or two will drive them away during such time as the buds of the gooseberry, currant, and plum, are open to their attacks; and again during the time that the cherries are ripe. To keep them from the fruit of late gooseberries and currants, it is sufficient to interlace thickly the bushes with red worsted. To keep them from attacking peas and other vegetables just emerging from the soil, a similar display of white thread fastened to pegs about six inches from the surface, is also efficiently deterring. Nets, where available, are also sufficient guardians. By these aids, but especially by the watching during certain seasons, the gardener may protect himself from injury at a very trifling expense, without depriving himself of the services of the most sharp-sighted, most unwearying, and most successful of all insect killers; and, it should also be added, one of the most agreeable appendages to rural life. Without birds, next to flowers, the country would be desolate. What delightful associations and recollections present themselves as we call to mind the chirping of the wren, the homely notes of the familiar cat-bird, the gambols of the martin, and the periodical visits of the confiding robin and snow-bird.

BIRD CHERRY. *Cerasus padus.*

BIRD PEPPER. *Capsicum baccatum.*

BIRD'S BILL. *Trigonella ornithopodioides.*

BIRD'S EYE. *Primula farinosa.*

BIRD'S FOOT. *Orthinopus.*

BIRD'S FOOT. *Euphorbia orthinopus.*

BIRD'S FOOT TREFOIL. *Lotus.*

BIRD'S NEST. *Asplenium Nidus.*

BIRD'S TONGUE. *Ornithoglossum.*

BIRTHWORT. *Aristolochia.*

BISCUTELLA. Twenty-three species. Hardy annuals and herbaceous perennials. Seeds. Loam and peat.

BISERRULA pelecinus. Hatchet vetch. Hardy annual. Seeds. Sandy loam or peat.

BITTER SWEET. *Solanum Dulcamara.*

BIVONÆA LUTEA. Annual. Seeds. Dry sandy soil.

BIXA. Three species. Stove evergreen trees. Seeds or cuttings. Sandy loam and peat.

BIZARRE. See *Carnation.*

BLACK ARCH MOTH. See *Bombyx.*

BLACK CATERPILLAR. See *Athalia.*

BLACK FLY. *Hallica nemorum.*

This is only one of the several popular names by which the turnip fly is known. The gardener is not so liable to suffer as is the farmer, from its ravages, yet he is sufficiently open to them to render a knowledge of its habits desirable. Mr. Curtis says:—

“The eggs of the common striped turnip fly are laid on the under side of the rough leaf of the turnip from April to September; they hatch in two days. Their maggots live between the two skins or cuticles of the rough leaf, and arrive at maturity in sixteen days. The chrysalis is buried just beneath the surface of the earth, where it remains about a fortnight. The beetles live through the winter in a torpid state, and revive in the spring, when they destroy the first two leaves, called the cotyledonous or seed leaves of the young turnip. There are five or six broods in a season. These insects are most to be feared in fine seasons.

“Heavy rains, cold springs, and long droughts, destroy them. Their scent is very perfect: the beetles fly against the wind, and are attracted from a distance. The rapid growth of the plant is the best security against them: to secure which, sow plenty of seed all of the same age. Burning the surface of the land is beneficial, by destroying the

chrysalids. Sheep folding must destroy the insect in every state. Deep digging is an excellent practice, when the chrysalids are in the soil. Drilling is a far superior practice to sowing the seed broadcast. Long raw manure harbours the beetles. The benefit derived from the application of lime and soot is very doubtful. Mangold wurzel is not favourable to the beetles, and Swedes are probably less attractive than white turnips. Mixing white turnips with Swedes is not desirable, as the beetles may be attracted by the strong scent of the former. Early sowing is attended with disadvantages. Destroy charlock, it affords support to the beetles before the turnips come up."

The most effectual banishment of the turnip fly, I think, is secured by sowing the surface of the soil with gas lime (hydro-sulphuret of lime) the next morning but one after the turnip seed has been sown. This is so offensive to the insect as to drive it away just at the time the young plants are appearing above ground. The most certain process is, after all, to sow very thickly; the flies will have their share—if too many remain, thin out.

BLACK VARNISH TREE. See *Melanorrhæa*.

BLACKWELLIA. Six species. Stove or evergreen shrubs. Cuttings. Sandy peat.

BLADDER BLIGHT. See *Peach*.

BLÆRIA. Eleven species. Green-house evergreen shrubs. Cuttings. Sandy peat.

BLAKEA. Two species. Stove evergreen shrubs. Ripencuttings. Peat and loam.

BLANCHING, or etiolation, is effected by making plants grow in the dark, and the more completely the light is excluded the more entire is the absence of colour from the leaves and stems of the plants. The colouring matter of these is entirely dependent upon their power to decompose water and carbonic acid gas, a power they do not possess when light is absent. The effect of blanching is to render the parts more delicately flavoured, more pleasing to the eye, and more crisp, properties very desirable in sea kale, celery, rhubarb, endive, lettuces, &c. Wherever it can be accomplished, blanching pots should be employed, in preference to covering the plants with earth or

other materials. The flavour is better, and decay is less liable to be induced. Lettuces and cabbages are usually whitened by tying the leaves over the heart or centre bud, but even in these instances the blanching pot operates much more effectually. In remote country places blanching pots may not be readily obtained; an equally useful aid is found by placing together two boards of a convenient length, so as to form as it were two sides of a triangle, or double pitched roof.

BLANDFORDIA. Two species. Green-house herbaceous perennials. Suckers or seeds. Sandy loam and peat.

BLAST or **BLIGHT**, is the popular name for any withering of plants of which neither the scientific title nor the causes are known to the observer. The mildew of corn; the honey dew on fruit trees; the withering occasioned by violent cold winds in early spring, and the ravages of the hawthorn caterpillar, are all spoken of by the uninformed under the above titles.

BLECHNUM. Thirteen species. Stove or green-house herbaceous perennial ferns. *B. serrulatum* is hardy. Seeds or division. Sandy loam and peat.

BLECHUM. Four species. Stove herbaceous perennial ferns. Cuttings. Loamy peat.

BLEEDING. See *Extravasated Sap*.

BLEPHARIS. Five species. Stove and green-house plants. *B. furcata* is an evergreen shrub. *B. procumbens* an evergreen trailer. Seeds. Loam and peat.

BLEPHILIA. Two species. Hardy herbaceous perennials. Division. Common soil.

BLETIA. Eleven species. Stove orchideous plants. Division. Sandy peat and light loam.

BLIGHIA sapida. Akee Tree. Stove evergreen tree. Cuttings. Loam and peat.

BLIND PLANTS frequently occur in the cabbage and others of the brassica tribe. They are plants which have failed to produce central buds, and as these are produced from the central vessels, if the top of their stems be cut away, they usually emit lateral or side buds from the edge of the wound. See *Barren Plants*.

BLITE, or Strawberry Spinach. (*Blitum*.)

BLITUM. Five species. Hardy annuals. Seeds. Common soil.

BLOOD. See *Animal Matters*.

BLOOM or **BLOSSOM**, is the popular name for the flowers of fruit-bearing plants.

“The organs of fructification are absolutely necessary, and are always producible by garden plants properly cultivated. They may be deficient in leaves, or stems, or roots, because other organs may supply their places; but plants are never incapable of bearing flowers and seeds, for without these they can never fully attain the object of their creation, the increase of their species.

“Every flower is composed of one or more of the following parts, viz.: the calyx, which is usually green and enveloping the flower whilst in the bud; the corolla, or petals, leaves so beautifully coloured, and so delicate in most flowers; the stamens or male portion of the flower, secreting the pollen or impregnating powder; the pistils or female portion, impregnable by the pollen, and rendering fertile the seeds; and lastly, the pericarp or seed-vessel.

“The stamens are the only portion of a flower which can be removed without preventing the formation of fertile seed, and their loss must be supplied by the induction to the pistils of pollen from some kindred flower.

“The calyx is not useless so soon as it ceases to envelope and protect the flower, for the flower stalk continues increasing in size until the seed is perfected, but ceases to do so in those plants whose calyces remain long green if these be removed; on the other hand, in the poppy and other flowers, from which the calyx falls early, the flower stalk does not subsequently enlarge.

“The corolla or petals, with all their varied tints and perfumes, have more important offices to perform than thus to delight the senses of mankind. Those bright colours and their perfumed honey serve to attract insects, which are the chief and often essential assistants of impregnation; and those petals, as observed by Linnæus, serve as wings, giving a motion assisting to effect the same important process. But they have a still more essential office, for although they are absent from some plants, yet

if removed from those possessing them before impregnation is completed, the fertilization never takes place. They therefore perform in such cases an essential part in the vegetable economy; and that they do so is testified by all the phenomena they exhibit. They turn to the sun open only when he has a certain degree of power, and close at the setting of that luminary; their secretions are usually more odorous, more saccharine, and totally differing from those of the other organs of plants; and in the absence of light those secretions are not formed.

“The corolla is not always short-lived, for although in some, as the cistus, the petals which open with the rising sun, strew the border as it departs, so some, far from being ephemeral, continue until the fruit is perfected. The duration of the petals, however, is intimately connected with the impregnation of the seed, for in most flowers they fade soon after this is completed; and double flowers, in which it occurs not at all, are always longer enduring than single flowers of the same species. Then, again, in some flowers, they become green and perform the function of leaves after impregnation has been effected. A familiar example occurs in the Christmas rose, (*Helleborus niger*), the petals of which are white, but which become green so soon as the seeds have somewhat increased in size, and the stamens and other organs connected with fertility have fallen off.

“It is quite true that some fruit will not ripen if the part of the branch beyond is denuded of leaves, but this only shows that those fruits cannot advance when deprived of leaves as well as of calyx and corolla, the only organs for elaborating the sap; and there are some flowers, as the *Daphne mezereon*, Autumn crocus, and sloe, that have their flowers perfected and passed away before the leaves have even appeared.

“That the petals perform an important part in elaborating the sap supplied to the fruit is further proved by the flower being unable to bloom or to be fertile in an atmosphere deprived of its oxygen; and by their absorbing more of that gas, and evolving more carbonic acid, than even a larger surface of leaves of the same plant.

"No seed ever attains the power of germinating, unless the pollen from the stamens in the same, or some nearly allied flower, has reached and impregnated its pistils."—*Johnson's Princ. of Gard.*

BLUMENBACHIA. Two species. Hardy annuals. Seeds. Rich loam.

BOBARTIA. Three species. Green-house herbaceous perennials. *B. aurantiaca* is hardy. Division. Sandy peat.

BOCCONIA. Two species. Stove evergreen shrubs. Cuttings. Loam.

BOEBERA. Two species. *B. chrysanthenoides* is a hardy annual. *B. incana*, a green-house evergreen shrub. Seeds. Loamy peat or common soil.

BOG-EARTH, or peat earth, is the soil required for a class of plants that are generally designated *American*, though not all of them are natives of that quarter of the globe. Bog-earth of the best description is thus constituted:—

Fine siliceous sand	156
Unaltered vegetable fibre	2
Decomposing vegetable matter }	110
Silica (Flint)	102
Alumina (clay)	16
Oxide of iron	4
Soluble vegetable and saline matter }	4
Muriate of lime	4
Loss	2

BOG EARTH PLANTS. See *American Plants*.

BOLBOPHYLLUM. Nineteen species. Stove epiphytes. Division. They require a strong damp heat.

BOLDOA. Two species. Stove plants. *B. lanceolata* an evergreen shrub. *B. purpurescens* an herbaceous perennial. Cuttings. Sandy peat.

BOLEUM *Asperum*. Half hardy evergreen shrub. Seed. Sandy peat.

BOLIVARIA *trifida*. Green-house evergreen shrub. Cuttings. Loam and peat.

BOLTONIA. Two species. Hardy herbaceous perennials. Division. Sandy loam.

BOMBAX. Silk cotton tree. Four species. Stove evergreen trees. Half ripened cuttings. Sandy loam.

BOMBYX, a genus of moths, of which the following are injurious to the gardener.

B. asculi, the horse-chestnut, or wood leopard moth, the last being the most appropriate name, as descriptive of its

spotted form. Its caterpillar injures the wood of the elm, apple, pear, horse-chestnut and walnut.

M. Kollar, in his valuable work on predatory insects, says:—"The caterpillar of this moth is smaller than that of the preceding species, its length being only one inch and a half or two inches. It is hatched in August, moults for the first time in September, and is full grown in June of the following year. From its existence till its transformation it is yellow, with raised shiny black dots, on each of which there is a fine short hair.

"It undergoes its transformation in a strong web under the bark, becoming a brownish-yellow pupa, capable of much extension, dark brown at both extremities, with short wingsheaths, a horn-like point bent forward on the head, and fine hooks on the back of the abdominal segments.

"The moth appears in August towards evening, and is a native of almost all Europe. It is very remarkable from its colour; the ground is white on various parts, on which steel blue dots are scattered. It measures, with extended wings, two inches and a half.

"The female introduces her round orange-coloured eggs, by means of her strong ovipositor, into the trees before named."

B. bucephala, Buff-tip moth, produces a caterpillar which feeds on the leaves of the lime, beech, birch, alder, oak, willow, and more rarely on those of the rose, apple and pear. M. Kollar says:—"This caterpillar does not appear till the latter end of June or the beginning of July, and feeds to the end of September; when fully grown it measures nearly two inches long, and is about as thick as a gossequill. It is thinly haired, dark brown, with interrupted slender yellow longitudinal stripes, which are intersected by a yellow cross, and between each segment.

"The moth appears in May and June, when it sits with its wings bent downwards, covering the whole body so that it resembles a scroll. When its wings are expanded, it measures from two and a half to three inches wide, the abdomen is pale yellow, spotted with black on the sides. The upper wings are notched, ash-grey, and silver-grey at the base and inner edge, a pale yellow, or silver grey kidney-shaped spot is

placed in the middle between two yellow cross lines. The under wings are of a yellowish-white; and have near the inner angle a greyish-brown and often faint double stripe. As the caterpillars when they appear are gregarious, they can easily be destroyed by picking them off when young."

B. cossus, Goat-moth. Its caterpillar is most destructive to the wood of fruit trees, though the elm, oak, willow, poplar, and walnut also, are liable to its attacks. M. Kollar says:—"It is one of the largest caterpillars known in Europe, measuring more than four inches in length. It is smooth and shining, beset only here and there with single short hairs. It is dark red on the back, and the spiracles situated at both sides are of the same colour. The sides and lower part of the body are flesh-coloured; the head is black, the first segment also marked with black above."

"After remaining more than two years in the larvæ state, and casting its skin eight times, the caterpillar becomes of a light ochre yellow hue, shortly before pupation, which usually takes place in spring; when it makes a strong cocoon of chips of wood and small pieces of bark, which it has gnawed off. The abdomen of the pupa is yellow, and the segments are deeply indented and capable of much extension. The back is furnished with strong pointed spines, sometimes of a reddish-brown colour. The cocoon is situated immediately within the opening in the tree, so that the pupa when arrived at maturity can press itself half out of the hole when the shell bursts, and the moth comes forth usually in the month of June or July, after having reposed in the pupa state for an indefinite time. When at rest the wings are folded together over the back in the form of a roof; it sits quietly in the daytime on the stems of trees, and is difficult to be distinguished on account of its grey colour. It measures with extended wings, from one tip to the other, nearly three inches, and many specimens are more than this; the female is usually larger than the male."

"The female is provided with a strong ovipositor, with which she introduces her eggs in the bark of the tree, the young caterpillars living at first in and between the outer and inner

bark, and afterwards, when they are stronger, penetrating into the wood."

"When we have actually ascertained the existence of one of these creatures in a trunk, by the extruded excrement, relief comes too late for the tree, even if we are able to kill the caterpillar, the mischief being already done. Notwithstanding this, the caterpillar should never be left undisturbed, and an attempt should be made to reach it, by enlarging the opening with a garden knife; or endeavouring to kill it by thrusting a piece of pointed wire up the hole of the tree."

B. dispar, Gipsy Moth. Its little caterpillar is found in early spring on the leaves of fruit trees, as they burst from the bud. M. Kollar, to whose pages I am so much indebted for accurate information relative to this species, says that—

"In unfavourable weather they collect upon the trunk near the top, or in the forks of the branches, and enclose themselves in a web; but when they feed, they disperse themselves all over the tree. They are immediately distinguished from other caterpillars by their large yellow-spotted head, and by the six pairs of red dots on the hinder part of the back."

"The males are dark brown, and their forewings have three or four undulating blackish stripes. The females are whitish-grey, and their forewings are traversed by brownish stripes."

"The moth lays her eggs in various places in August and September, but chiefly on the trunks of the fruit trees, on which the caterpillars lived. It also lays its eggs in places that are not very near fruit trees, viz., on garden buildings, palings and walls, so that the young caterpillars have to go a considerable distance in search of food, which is seldom the case with insects. The eggs lie in a shapeless mass one inch long, and a quarter of an inch high, to the number of two to five hundred together, and are surrounded with yellowish hair, which preserves them from the winter's cold."

B. monacha, Black arch moth. Its caterpillar prefers the leaves of the fir tribe, but also attacks fruit trees, the oak, aspen, elm, lime, and willow. M. Kollar states that—"The moth is of the medium size. It sits during the day, with its wings lying close to its body

in a slanting direction; and when its wings are expanded, they measure above two inches from one point to the other. There are four or five black notched lines on the upper wings, on a white ground, and there is a black spot between the middle ones. The front of the body is white, with black spots, and the abdomen varied with black rings, and red incisions, which, however, are sometimes wanting.

"The caterpillar, when fully grown, measures from one and a half to one and three-quarter inches, the transverse diameter one line and a half. It is usually of a brown grey mixed with black, and occasionally entirely black; sometimes, but still more rarely, it is of a whitish colour. The head is large, covered with short hairs, and it has a brownish line along the forehead, which ends in a triangular spot of the same colour over the mouth. Wherever it goes it spins a thread after it out of the spinnerets under the mouth. If its resting-place be shaken, it hastily lets itself down and curls itself up. It usually goes into the pupa state from the beginning of June to July, when the caterpillar is fully grown; the pupa is surrounded by a slight web, which is sometimes formed among the foliage, and sometimes over hollows of the bark; after which the caterpillar skin is cast off in three or four days. The pupa is three-quarters of an inch long; at first green, then a brownish red, and afterwards becomes somewhat darker, or rather blackish, with a metallic appearance.

"The moth sometimes appears in the last days of July or beginning of August; but the late ones do not appear till September. After pairing, the female lays her eggs by means of her ovipositor, in the cracks of the bark of the old trees, in the form of a bunch of grapes, to the amount of twenty or thirty in each cluster. As the ovipositor cannot be used on the beech, oak, and birch, she lays her eggs on the bark, and flaps her wings over them, to cover them with the dust from her wings and body. One female usually lays one hundred and twenty eggs in the course of twenty-four hours, at three or four intervals. They are not spherical, but flat on two sides, and very sharp and rough to the touch."

B. chrysorrhea. Yellow-tailed moth.

Its caterpillar usually confines its attacks to the leaves of the white and black thorn, but sometimes spreads to our fruit trees. M. Kollar observes that—"In the day time it sits quietly on a leaf, or on a wall, and suffers itself to be caught in the hand. It has received its name from the posterior part of its body being covered with a round mass of golden yellow hair. Its forewings are of a dazzling whiteness, as is also the greater part of its body; only the principal vein of the forewing of the male is brown on the under side, and it has also sometimes a few black dots on its wings.

"At the end of June this moth usually appears, seeks a companion, and continues its species. The female usually lays her eggs on the under side of the leaf, in a small heap or mass, and covers them with hair from her tail. Hence, nothing is seen of the eggs, as they lie in rows under the covering of hair. The number of eggs in the heap amounts to from two to three hundred; they are round, and of a gold colour; when the female has laid her eggs she dies, after having applied all the hair from her tail to form the covering. The caterpillars are usually hatched at the end of July. They have a dirty-yellow appearance, a black head, and a black ring round the neck; they are thickly covered with hair, and have four rows of blackish dots along the back. They change their skins in August. In the middle of September they cease feeding, and in October they only come out of their nest in very warm days, when they lie on the outside, but return to the nest in the evening. They become benumbed in November, and even in extreme cold they only become benumbed, and resume their activity when warm weather sets in. Before the buds on the trees have begun to burst in spring, some of the caterpillars come out of their nests and eat the folded leaves. In the course of a few days they are found in multitudes at the forks of the branches in the side of the tree exposed to the sun."—*Kollar*.

B. caruleocephala. Figure-of-eight moth. Its caterpillar selects the leaves of the black and white thorn, almond, apricot, and peach, though it will attack those of other trees. Kollar tells us that—"At the time of pupation these

caterpillars repair to the stems of the trees, or to walls and hedges, where they make for themselves cases of moss, lime, dust, and small chips of wood, oval on the upper side and flat below, in which they do not become pupæ till the third week. The pupa small, cylindrical, reddish-brown, dull, in some degree powdered with blue.

"The perfect insect or moth measures, with extended wings, from tip to tip, one inch and from six to nine lines. The forewings bluish grey, rather shining, divided by three incisions at the sides, and situated between two blackish undulated cross lines, have been sometimes compared to a pair of spectacles (or a figure of eight)."

B. lubricipeda. Spotted buff moth. The caterpillars of this feed on the leaves of elder, horse-radish, lilacs, beans, and indeed seem to be omnivorous. The larvæ appear in June and July, and are thus described by Mr. Curtis:—

"The back is dark green, and the under side pale green, with a wavy white line down each side, from the head to the tail. The spiracles also are white; the whole animal is covered with little rust-coloured cushions, which produce brushes of longish reddish-brown hairs, so that it resembles a little bear's skin. When full grown, they retire to the stems of plants and the chinks in walls, to change to black shining chrysalids, in an oval loose cocoon, composed of silk, and the hairs from their skin.

"The moth rests with its wings de-flexed; is of a pale ochre, or buff colour; the antennæ are black, and bipectinated in the male; the eyes, palpi, and legs are also black, excepting the thighs, which are of an orange colour, and the tibia and tarsi are variegated with buff; the upper wings have two long black spots upon the costal margin, with one or more dots near the base, in a transverse line. As the moths stick about plants and walls, often in pairs, in May and June, they are easily detected, and it becomes necessary to kill them to prevent the havoc they make with the foliage."—*Gard. Chron.*

B. phæorrhæa. Brown-tailed moth. M. Kollar states that—"According to Curtis, the caterpillar of the brown-tailed moth is found on the hawthorn

and oak most plentifully; elm very plentifully; most fruit trees the same; blackthorn plentifully; rose-trees the same; on the willow and poplar scarce. None have been noticed on the elder, walnut, ash, fir, or herbaceous plants. With respect to fruit trees, the injuries they sustain are most serious, as in destroying the blossoms as yet in the bud, they also destroy the fruit in embryo; the owners of orchards, therefore, have great reason to be alarmed.

"This moth is so closely related to the yellow-tailed moth, and its habits so similar, that the means suggested for the destruction of the one may be advantageously adopted for the other.

"In the month of June, when almost full grown, this caterpillar measures nearly two inches, and is of the thickness of a very thick quill; it is very juicy, of a yellowish-green colour, with black tubercles, each of which bears a single hair, and has three pale yellow stripes, running longitudinally; the middle one extending rather broadly along the back. It has a small bluish head, with two black round spots on it.

"At the time of pupation, these caterpillars repair to the stems of the trees, or to walls and hedges, where they make for themselves cases of moss, lime-dust, and small chips of wood, oval on the upper side, and flat below, in which they do not become pupæ till the third week. The pupa is small, cylindrical, reddish-brown, dull in some degree, powdered with blue."

—Kollar.

B. antiqua, Vapourer, or brown tusssock moth. This moth appears from August to October. Mr. Curtis informs us that—"The males then fly about in pursuit of their consorts, who are destitute of wings, and after depositing a large number of eggs, fall down exhausted and die. These eggs are somewhat ovate, depressed, and hollow on the crown, round which is a brown ring. They are of a pinky-white colour, and are fastened as they are laid, by a glutinous substance, to the bark of the tree, or whatever the parent happens to rest upon, frequently to the web containing the shell of the pupa; they are hatched the following April, when the larvæ attack a great variety of trees, feeding upon the leaves of roses, brambles, the apple, plum, sloe, hawthorn, oak, lime, alder, and sallow. The caterpillars

often do considerable mischief to the rose-trees, by eating large holes in the leaves; and, keeping on the under sides, they are seldom visible until they are full-grown, when they are often an inch in length, and ramble about to select some suitable crevice in the bark of a tree or other secure place to spin their fine white silken web, strengthened and protected with the different hairs from their own bodies; in this web they change to pitch colour, and rather hairy chrysalides, from whence the moths are produced at various periods."—*Gard. Chron.*

BONAPARTEA. Two species. Stove epiphytes. Seed. Rich sandy loam.

BONATEA speciosa. Stove epiphyte. Division. Sandy peat and loam.

BONES are beneficial as a manure, because their chief constituent (phosphate of lime) is also a constituent of all plants; and the gelatine which is also in bones is of itself a source of food to them. The bones of the ox, sheep, horse, and pig, being those usually employed, their analyses are here given:—

	Ox	Sheep	Horse	Pig
Phosph. of lime	55	70	68	52
Carb. of lime	4	5	1	1
Animal matter	33	25	31	47

The bones must be applied to the crops in very small pieces or powder; and ten pounds at the time of inserting the seed is enough for thirty square yards, if sown broadcast; and a much smaller quantity is sufficient if sprinkled along the drills in which the seed is sown. There is no doubt that bone dust may be employed with advantage in all gardens and to all garden-crops, but it has been experimented on most extensively with the turnip and potato, and with unfailling benefit. Mixed with sulphur, and drilled in with the turnip seed, it has been found to preserve the young plants from the fly. Mr. Knight found it beneficial when applied largely to stone-fruit, at the time of planting; and it is quite as good for the vine. To lawns, the dust has been applied with great advantage when the grass was becoming thin. As a manure for the shrubbery, parterre, and green-house, it is also most valuable; and crushed as well as ground, is employed generally to mix with the soil of potted plants. Mr. Maund finds it promotes the luxu-

riance and beauty of his flowers. One pound of bone-dust mixed with twelve ounces of sulphuric acid (oil of vitriol), and twelve ounces of water, if left to act upon each other for a day, form super-phosphate of lime, a wine-glass full of which has been found beneficial to pelargoniums. Applied as a top-dressing, mixed with half its weight of charcoal dust, it is a good manure for onions, and may be applied at the rate of nine pounds to the square rod. There is little doubt of this super-phosphate being good for all our kitchen-garden crops, being more prompt in its effects upon a crop than simple bone-dust, because it is soluble in water, and therefore more readily presented to the roots in a state for them to imbibe.

BONNETIA palustris. Stove evergreen tree. Cuttings. Loam and peat.

BONTIA daphnoides. Stove evergreen tree. Cuttings. Loam and peat.

BORAGE (*Borago officinalis*). Its young leaves are sometimes used in salads, or boiled as spinach. Being aromatic, its spikes of flowers are put into negus and cool tankards.

Soil and situation.—For the spring and summer sowing, any light soil and open situation may be allotted, provided the first is not particularly rich; but for those which have to withstand the winter, a light dry soil, and the shelter of a south fence, is most suitable. A very fertile soil renders it super-luxuriant, and injures the intensity of its flavour.

Times and mode of sowing.—It is propagated by seed, which is sown in March or April, and at the close of July, for production in summer and autumn, and again in August or September, for the supply of winter, and succeeding spring. These sowings to be performed in shallow drills, six inches asunder. When of about six weeks' growth, the plants are to be thinned to six inches apart, and the plants thus removed of the spring and autumn sowing, may be transplanted at a similar distance; but those of the summer seldom will endure the removal, and at all times those left unmoved prosper most. At the time of transplanting, if at all dry weather, they must be occasionally watered moderately until established; water must also be frequently applied to the seed bed of the summer sowing, otherwise the vegetation will be slow and weak.

To obtain seed.—To save seed, some of those plants which have survived the winter must be left ungathered from. They will begin to flower about June; and when their seed is perfectly ripe, the stalks must be gathered, and dried completely before it is rubbed out.

BORAGO. Six species. Hardy. Division or seed. Common soil.

BORASSUS *flabelliformis*. Stove palm. Seed. Loam and peat.

BORBONIA. Nine species. Greenhouse evergreen shrubs. Cuttings. Peat and loam.

BORDER, is a name applied to that narrow division of the garden which usually accompanies each side of a walk in the pleasure-grounds, and to the narrow bed which is close to the garden wall on one side, and abuts on a walk on the other. The walls being mostly occupied by fruit trees, the latter may be considered as the fruit-borders, and the first-named as the flower-borders.

1. *Fruit-borders.*—Next to the wall should be a path three feet wide, for the convenience of pruning and gathering. Next to this path should be the border, eight or nine feet wide; and then the broad walk, which should always encompass the main compartments of the kitchen garden. The whole of the breadth from the wall to the edge of this main walk should be excavated to the depth of four feet; the bottom of the excavation rammed hard; brickbats and large stones then put in to the depth of one foot and a half; and the remaining two feet and a half filled up with suitable soil. From the underdrainage of brickbats, &c., draining pipes should be laid, with an outfall into some neighboring ditch. No fruit tree will be healthy if it roots deep, or if its roots are surrounded by superfluous water—that is, more water than the soil will retain by its own chemical and capillary attractions. Shallow rooting crops do no harm to the trees grown on fruit borders sufficient to require their total banishment.

2. *Flower borders.*—These, like the preceding, and indeed like every other part of the garden not devoted to aquatic and marsh plants, should be well drained. In plotting them it must also be remembered, that if narrow, no art will impart to them an aspect of boldness and grandeur. Indeed narrowness

of surface is inseparably connected with an impression that the grounds are of limited extent, and no disposal of the plants will remove the littleness thus suggested. If the pleasure grounds are small, narrow borders are permissible, but even then the broader they are the less is the appearance of meanness. Neatness must be the presiding deity over flower borders, and no application of the hoe and rake, no removal of decayed leaves, no tying up of straggling members, can be too unremitting.

For the arrangement of the plants, see *Flowers*; and for particular cultivation, each will be found under the name of the plant.

BORECOLE, *Brassica oleracea fimbriata*.

Varieties.—Of the following, 1, 2, 3, 5, 6, 7, 8, 9, 10, 11, and 16, are the best.

1. Brussels Borecole, or Sprouts.
2. Green Borecole, *Brassica oleracea selenisia*.
3. Purple Borecole, *B. oleracea laciniata*.
4. Variegated Borecole.
5. German or Curled Kale, or Cur-lies.
6. Scotch or Siberian Kale, *B. o. sabellica*.
7. Chou de Milan.
8. Egyptian or Rabi Kale.
9. Ragged Jack.
10. Jerusalem Kale.
11. Buda-Russian, or Manchester Kale.
12. Anjon Kale.
13. One-thousand-headed cabbage.
14. Palm Borecole.
15. Portugal or large ribbed.
16. Woburn perennial.

Woburn kale may be propagated by cuttings, six inches long, planted where to remain in March or April.

Buda kale is greatly improved by blanching under a pot, like sea kale.

Sowing.—The first crop sow about the end of March, or early in April, the seedlings of which are fit for pricking out towards the end of April, and for final planting at the close of May, for production late in autumn and commencement of winter. The sowing must be repeated about the middle of May; for final planting, during July, and lastly in August, for use during winter and early spring.

Pricking out.—Their fitness for

pricking out is when their leaves are about two inches in breadth; they must be set six inches apart each way, and watered frequently until established. In four or five weeks they will be of sufficient growth for final removal.

Planting.—When planted, they must be set in rows two feet and a half apart each way, the last plantation may be six inches closer. They must be watered and weeded, and as they are of large spreading growth, the earth can only be drawn about their stems during their early growth. If during stormy weather any of those which acquire a tall growth are blown down, they must be supported by stakes, when they will soon firmly re-establish themselves.

To raise seed.—For the production of seed, such plants of each variety as are of the finest growth must be selected, and either left where grown or removed during open weather in November, or before the close of February, the earlier the better, into rows three feet apart each way, and buried down to their heads. The seed ripens about the beginning of August.

BORONIA. Twelve species. Green-house evergreen shrubs. Cuttings. Sandy peat.

BORRERIA. Three species. Stove or green-house. Cuttings. Common soil.

BOSCIA senegalensis. Stove evergreen shrub. Cuttings. Rich clayey loam.

BOSEA yervamora. Green-house evergreen shrub. Cuttings. Loam and peat.

BOSTRICHUS, a class of beetles, many of which are very injurious to the crops of the garden.

B. dispar, Apple bark beetle. The female of this insect bores into the wood of the apple tree, and there deposits her eggs, generally in the month of May; and its perforations are so numerous and extensive, as frequently, on the continent, to destroy the tree. In England it rarely occurs. The perforations are confined to the alburnum of the wood.

B. typographus, Typographer bark beetle. This attacks the pine tribe, especially the silver fir.

B. pinastri, Pinaster, or red bark beetle, confines its attacks to the pines, leaving the firs untouched, as the *B. larius* lives exclusively on the larch,

and the *B. orthographus* on the spruce fir.

BOSWELLIA, Alibäum tree. Two species. Stove evergreen trees. Cuttings. Loam and peat.

BOTANY BAY TREE, *Smilax glycyphylla.*

BOTRYCHIUM, Moonwort. Six species. Hardy ferns. Division, or seed. Loam and peat.

BOTTOM HEAT. Naturally the temperature of the soil always bears a due relative proportion to that of the air. When the temperature of the air decreases, that of the soil also decreases, but very slowly; and when the atmospheric heat increases, that of the soil also gradually rises. Bottom heat, or heat applied below the roots of plants, is the artificial mode of imitating this proceeding of nature in our hot-houses, and other structures of that kind. If the temperature of the soil be too cold in proportion to the temperature of the atmosphere, the roots are not stimulated sufficiently to imbibe food as fast as it is required by the branches and foliage, and as a consequence the leaves or fruit will fall or wither. On the other hand, if the temperature of the soil be too great in proportion to that of the atmosphere, the roots absorb food faster than it can be elaborated by the branches and leaves, and as a consequence, over luxuriant shoots, and an extra development of leaves, are caused instead of blossoms, and a healthy progress in all the parts.

Every plant obviously will have a particular bottom heat most congenial to it. Plants growing in open plains, as at the Cape of Good Hope, will require a higher bottom heat than those growing in the shade of the South American forests, though the temperature of the air out of the shade may be the same in each country. That gardener will succeed in exotic plant-culture best, who among his other knowledge has ascertained the relative temperature of the air and soil in which any given plant grows naturally. At present, such information from actual observation is not obtainable, but it is not so difficult to ascertain the maximum and minimum temperature of the air of a country; and this being obtained, the gardener may adopt this as a safe rule. Let the bottom heat for plants of that country be always 5° higher than the average

temperature, or if the average maximum temperature of the air only be known, let the bottom heat be less by 10° than the *maximum* temperature of the air.

Dr. Lindley very justly observes upon this subject, that "we have doubtless much to learn as to the proper manner of applying bottom heat to plants, and as to the amount they will bear under particular circumstances. It is in particular probable, that in hot-houses plants will not bear the same quantity of bottom heat as they receive in nature, because we cannot give them the same amount of light and atmospheric warmth; and it is necessary that we should ascertain experimentally whether it is not a certain proportion between the heat of the air and earth that we must secure, rather than any absolute amount of bottom heat.

"It may also be, indeed it no doubt is, requisite to apply a very high degree of heat to some kinds of plants at particular seasons, although a very much lower amount is suitable afterwards; a remark that is chiefly applicable to the natives of what are called extreme climates, that is to say, where a very high summer temperature is followed by a very low winter temperature; such countries are Persia, and many parts of the United States, where the summers are excessively hot, and the winter's cold intense. The seeming impossibility of imitating such conditions artificially, will probably account for many of the difficulties we experience in bringing certain fruits, the Newtown pippin, the cherry, the grape, the peach, and the almond, to the perfection they acquire in other countries."—*Theory of Horticulture*.

BOURGEON, or *Burgeon*. See *Bud*.

BOURRERIA. Two species. Stove evergreen trees. Cuttings. Sandy loam.

BOUSSINGAULTIA *baselloides*.—Half-hardy bulbous perennial. Seeds. Common soil.

BOUVARDIA. Five species. Green-house or stove evergreen shrubs. Cuttings or division. Loam and peat.

BOWER. See *Arbor*.

BOX (*Buxus sempervirens*), is noticed by the gardener chiefly as a plant suitable for edgings. For this purpose it is neat, and certainly the best article used. In some gardens it is suffered to attain too great bulk, and then becomes rather a defect than ornament, exhausting the soil, and presenting a safe lurking place

for insects; it should not be allowed to rise higher than six or eight inches, and as much in breadth—if necessary to restrain its growth, transplant. The best seasons for planting box are at mid-summer, and early in the spring. Small rooted slips are employed, and are planted against the perpendicular side of a small trench along the edge of the border or bed they are desired to bound. The best month for clipping box is June, and it should be done in showery weather.

BRABEJUM *stellatum*. Green-house evergreen shrub. Ripe cuttings. Sandy loam and peat.

BRACHYCOME *iberidifolia*. "Seeds of this," says Dr. Lindley, "should be sown in March in pots or shallow pans, filled with light rich soil, and well drained, and the pots should be plunged in a gentle hot-bed. As soon as the young plants are established, they must be kept in a green-house; shift into larger pots as they require it. Those that are to be grown out of doors should be planted out in a prepared bed early, say by the end of May, in order that they may perfect their seeds in September or early in October."—*Gard. Chron.*

BRACHYLÆNA *nereifolia*. Green-house evergreen shrub. Cuttings. Sandy peat.

BRACHYSEMA. Two species. Green-house evergreen climbers. Layers, cuttings, or seeds. Sandy loam and peat.

BRACHYSTELMA. Two species. Stove tuberous-rooted perennials. Cuttings. Sandy loam.

BRASSAVOLA. Twelve species. Stove epiphytes. Division. Wood.

BRASSIA. Eleven species. Stove epiphytes. Division. Wood.

BRASSICA. The cabbage tribe. See *Brocoli*, *Cauliflower*, &c.

BRAYA. Two species. *B. alpina*, a hardy herbaceous perennial; *B. pilosa*, a hardy evergreen shrub. Seeds. Loamy peat.

BREAKING. A Tulip's flower is *broken* when it has attained its permanent colors. A bulbous root is said to *break* when its foliage begins to be thrust forth.

BREMONTIERA *ammoxylon*. Stove evergreen shrub. Cuttings. Sandy loam.

BRESIA. Three species. Stove

evergreen trees. Cuttings. Turfy loam and peat.

BRICKS. As the gardener often may require to know how many bricks will be required for an intended structure, it will be a guide for him to know that all bricks sold in England are required by statute (17 Geo. 3, c. 42) to be eight and a half inches long, four inches wide, and two and a half inches thick. Pantiles, by the same authority, must be thirteen and a half inches long, nine and a half inches wide, and half an inch thick.

BRIDGES are inconsistent with the nature of a lake, but characteristic of a river; they are on that account used in landscape gardening to disguise a termination; but the deception has been so often practised, that it no longer deceives, and a bolder aim at the same effect will now be more successful. If the end can be turned just out of sight, a bridge at some distance raises a belief, while the water beyond it removes every doubt, of the continuation of the river; the supposition immediately occurs, that if a disguise had been intended, the bridge would have been placed further back, and the disregard thus shown to one deception gains credit for the other.

As a bridge is not a mere appendage to a river, but a kind of property which denotes its character, the connexion between them must be attended to; from the want of it, the single wooden arch once much in fashion, seemed generally misplaced; elevated without occasion so much above it, it was totally detached from the river; and often seen straddling in the air, without a glimpse of the water to account for it, and the ostentation of it as an ornamental object diverted all that train of ideas which its use as a communication might suggest. The vastness of Walton Bridge cannot without affectation be mimicked in a garden where the magnificent idea of inducting the Thames under one arch is wanting; and where the structure itself, reduced to a narrow scale, retains no pretension to greatness. Unless the situation make such a height necessary, or the point of view be greatly above it, or wood or rising ground instead of sky behind it fill up the vacancy of the arch, it seems an effort without a cause, forced and preposterous.

The vulgar footbridge of planks, only guarded on one hand by a common rail, and supported by a few ordinary piles, is often more proper. It is perfect as a communication, because it pretends to nothing further, it is the utmost simplicity of cultivated nature; and if the banks from which it starts be of a moderate height, its elevation preserves it from meanness.

No other species so effectually characterizes a river; it seems too plain for an ornament, too obscure for a disguise; it must be for use, it can be a passage only; it is therefore spoiled if adorned, it is disfigured if only painted of any other than a dusky colour. But being thus incapable of all decoration and importance, it is often too humble for a great, and too simple for an elegant scene. A stone bridge is generally more suitable to either, but in that also an extraordinary elevation compensates for the distance at which it leaves the water below.

A gentle rise and easy sweep more closely preserve the relation; a certain degree of union should also be formed between the banks and the bridge, that it may seem to rise out of the banks, not barely to be imposed upon them; it ought not generally to swell much above their level, the parapet wall should be brought down near to the ground, or end against some swell, and the size and the uniformity of the abutments should be broken by hillocks or thickets about them; every expedient should be used to mark the connexion of the building, both with the ground from which it starts, and the water which it crosses.

In wild and romantic scenes may be introduced a ruined stone bridge, of which some arches may be still standing, and the loss of those which are fallen may be supplied by a few planks, with a rail thrown over the vacancy. It is a picturesque object, it suits the situation and the antiquity of the passage; the care taken to keep it still open, though the original building is decayed, the apparent necessity which thence results for a communication, give it an imposing air of reality.—*Whateley*.

BRINING. See *Steeping*.

BROADCAST, is a mode of sowing now rapidly falling into disuse in the garden as well as in the field. It has no one advantage over sowing in drills,

except that the work of sowing is done more expeditiously. Subsequently, the saving is all on the side of the drill system. See *Drilling*. I know of no sowing where the broadcast mode is preferable, except in the case of grass seeds upon lawns. Loudon thus describes the operation of broadcast sowing:—"The seed is taken up in portions in the hand, and dispersed by a horizontal movement of the arm to the extent of a semicircle, opening the hand at the same time, and scattering the seeds in the air, so as they may fall as equally as possible over the breadth taken in by the sower at once, and which is generally six feet, that being the diameter of the circle in which his hand moves through half the circumference. In sowing broadcast on the surface of his beds, and in narrow strips or borders, the seeds are dispersed between the thumb and fingers by horizontal movements of the hand in segments of smaller circles."

BROCCOLI. *The same in Eng., Fr., and Ital. Italienische Kohl, Ger. Broccoli, Span.* "This exquisite vegetable resembles the cauliflower in growth, appearance, and flavour, and is supposed to have originated from it. Some of the varieties produce white heads, others purple, sulphur coloured, &c. It is cultivated with less trouble than the cauliflower, and heads with more certainty. The autumn is the season in which it is generally perfected, but with proper management may frequently be had throughout the winter and spring.

"The varieties are extensive, and differ in the time of ripening, as well as hardiness. Those we have cultivated with most success are the purple cape, sulphur coloured, and early cauliflower broccoli. There are also several other autumnal kinds, such as the green cape, early purple, early white, cream-coloured, or Portsmouth, &c.; but the purple cape is much the most certain to head, indeed the only one to be relied on in this climate. Our plan of cultivation has been, to sow the seed from the middle to latter end of spring; transplanting them when they attain the size at which cabbage plants are generally put out.

"Should the weather prove very dry at the periods in which it is proper to sow, some difficulty may be found in getting the seed to vegetate; in that

case choose a spot shaded from the mid-day sun, and cover the bed with straw litter, lightly spread over the surface, which suffer to remain until the seeds sprout, when it should be immediately removed. Bass mats or cloths are sometimes used for this purpose; they should be removed every evening, and replaced in the morning, else the seed loses the benefit of the dew.

"A few observations only are necessary as to the progressive culture of the broccoli. Having, in the first place, selected a deeply dug, rich piece of ground, and planted them therein as you would cabbage plants, allowing them rather more room, do not neglect to hoe and stir the ground, keeping it perfectly clean and free from weeds; when they are six or eight inches high, land them up, that is, with the hoe draw around the base of the plants some of the loose soil, forming it like a basin, the stock of the plant being the centre. If dry weather ensue, give an occasional watering, which will greatly facilitate their growth.

"The earlier sowings will commence heading early in the autumn; the latter sown plants, many of them will show no appearance of heading before winter. On the approach of black frost they are to be removed to some sheltered situation, and "laid in," after the manner of winter cabbage; that is, burying the stalk entirely up to the lower leaves, the crown projecting at an angle of 45 degrees. They are more tender than the cabbage, and require to be protected against severe frost, which may readily be done by setting over them frames, such as are placed on hot-beds, and cover with shutters, or by setting boards on edge around them, the back the highest, on which lay a covering of boards similar to a roof. Thus they are sheltered from frost, and undue quantities of rain. As the winter advances, and the frost becomes more severe, give an additional covering, of straw scattered loosely immediately over the plants inside the board covering. In this situation they will remain secure, some of them heading from time to time during the winter, and most of them producing fine heads in spring. Care should be observed to remove the straw covering on the arrival of spring, and to raise the shutters or boards in fine weather, that air may be freely ad-

mitted, removing them entirely the latter part of March.

"It is the practice of some who have light dry cellars, to place them therein, when removing them in the autumn, burying the roots and stalks as above directed. In that situation they require no further care or protection. Broccoli is sometimes sown about the middle of September, the plants preserved in frames during winter, and put out in the spring. They are by no means certain to succeed well at that season; a few nevertheless might be thus managed, as they will generally head in the autumn, when failing to do so during the summer months.

"All the Brassica or Cabbage tribe is subject to be preyed upon by various insects, the most destructive of which in this country is the 'Black Fly' (*Haltica nemorum*); and in such immense quantities do they sometimes appear, and so voracious their appetite, that extreme difficulty is found in protecting the young plants from their depredations. As soon as they appear, take wood ashes, mixed with one-third air-slaked lime, and sprinkle over the entire plants, first wetting the leaves that the dust may adhere; this should be repeated as often as it flies off, or is washed off by rain. An application of lime water is also beneficial; it is disagreeable to the fly as well as the slug; the latter insect preys much upon them in damp weather. But the most certain preventive is a solution of whale-oil soap—a solution of common soft-soap or brown-soap, would probably answer the purpose; the alkali therein is particularly offensive to that troublesome intruder."—*Rural Register*.

BRODLÆA. Two species. *B. congesta*, green-house; *B. grandiflora*, half-hardy bulbous perennials. Offsets. Sandy peat.

BROMELIA. Fifteen species. Chiefly stove herbaceous perennials. *B. discolor* is an evergreen shrub; *B. exudans*, an epiphyte. Suckers. Rich loamy soil.

BROMHEADIA palustris. Stove epiphyte. Offsets. Peat and potsherds.

BRONGNIARTIA, *podalyrioides*. Green-house evergreen shrub. Cuttings. Sandy loam and peat.

BROOM. See *Besom*.

BROSIMUM. Two species. Stove evergreen shrubs. Cuttings. Loamy soil.

BROTERA, *corymbosa*. Hardy herbaceous perennial. Division. Loam and peat.

BROUGHTONIA. Two species. Stove epiphytes. Division. Wood.

BROUSSONETIA. Two species. Hardy deciduous trees. Cuttings. Light open soil.

BROWALLIA. Four species. Green-house annuals. Seeds. Rather sandy soil.

BROWNEA. Five species. Stove evergreen shrubs. Ripe cuttings. Sandy loam and peat.

BROWNLOWIA elata. Stove evergreen tree. Cuttings. Sandy loamy soil.

BRUCHUS, a genus of beetles.

B. granarius and *B. pisi* are greatly destructive to our pea crops. They are small brownish beetles, usually found at the same time the plants are in flower, and they deposit their eggs in the tender seeds of leguminous plants, and sometimes in different kinds of corn. In these the larva, a small white fleshy grub, finds both a suitable habitation and an abundance of food. It undergoes all its transformations in the seed, and the perfect insect remains in it till the spring, though in fine autumns the perfect insects appear at that season also. The larvæ possess the singular instinct of never attacking the vital part of the seed till the last.

We have often observed the seed pods of chorozema, and other delicate and scarce leguminous plants in green-houses, pierced by the *Bruchus pisi*. The more effectual remedy is to pull up and burn the haulm and pods altogether, and not attempt to get a crop at all. Peas infested with *B. granarius*, are always known by a small hole being on one side, and these should be carefully picked out, as they not only spoil the appearance of a sample, but spread the injury.

BRUGMANSIA. Four species. Green-house evergreen shrubs. *B. Waymanii* is a stove evergreen tree. Cuttings. Rich soil.

BRUISE. See *Canker*.

BRUNIA. Eighteen species. Green-house evergreen shrubs. Cuttings. Sandy peat.

BRUNNICHIA cirrhosa. Green-house evergreen climber. Cuttings. Loamy soil.

BRUNONIA australis. Hardy herb-

aceous perennial. Division. Loamy soil. A frame or cool green-house is suited for its growth.

BRUNSFELSIA. Four species. Stove evergreen shrubs. Cuttings. Good rich soil.

BRUNSVIGIA. Thirteen species. Green-house bulbous perennials. Offsets. Rich mould.

The bulbs, while dormant, which is during winter, are kept in a cool green-house, in as dry and airy a place as possible, until they begin to show leaves; then to be potted in three parts good turfy loam, one part leaf-mould and a little silver sand, and placed so that they have the full benefit of the light.

When the leaves have grown to about twelve inches in length, plunge in a strong bottom heat, and allow to remain till the flower-stem pushes clear of the leaves, which will be in about four or five weeks. They must then be gradually hardened off and returned to the green-house, there to expand their blossoms, which consist of a number of from twenty to thirty flowers.

After flowering, every care must be taken of the foliage, by exposing it to the full influence of the sun, and giving plenty of water.

When the plants show an inclination to rest, water must be altogether withheld.

BRYA. Two species. Stove evergreen shrubs. Cuttings or seed. Very rich soil.

BRYOPHYLLUM *calicinum*. Stove evergreen shrub. Leaves. Rich loamy soil.

BUCIDA *buceras*. Stove evergreen tree. Ripe cuttings. Loam and peat.

BUDS. The buds are organized parts of a plant, of an ovate or conical form, and containing the rudiments of future branches, leaves, and flowers, which remain latent until circumstances favour their development. The same buds accordingly, as circumstances vary, produce either flowers or leaves. Buds spring from the alburnum, to which they are always connected by central vessels.

BUDDING is the art of making a bud unite to the stem or branch (then called the stock) of another tree or shrub, independently from its parent. The object thus attained is a rapid multiplication of that parent; and in the case of seedlings, an earlier production of fruit

than if the buds were left upon the parent. Delicate kinds are strengthened by being *worked*, as it is technically termed, upon more robust stocks, as when a tender vine is budded on the Syrian, and the double yellow rose upon the common China. Variegated roses often lose their distinctive marks if grown upon their own roots. Roses budded upon the common brier afford finer flowers than upon their own stems. Buds from seedling peaches and pears are earlier productive—and produce finer fruit—budded upon a robust stock; but buds of the pear inserted earlier than the close of August, produce branches and not blossoms. Where the bud comes in contact with the wood of the stock, a confused line is visible, between which line and the bark of the bud new wood is produced, having solely all the characteristics of the parent of the bud. Buds of almost every species succeed with most certainty if inserted in shoots of the same year's growth: but the small walnut buds succeed best which are taken from the base of the annual shoots, where these join the year old wood of that from which the bud is taken. Buds are usually two years later than grafts in producing fruit, but then every bud will produce a new plant, but each graft has at least three upon it. Buds succeed more readily than grafts, and if a graft inserted in the spring has failed, a bud may succeed in the summer of the same year. Buds are ready for removal when their shield, or bark attached to them, separates readily from the wood. This is usually in July or August, and is intimated by the buds being well developed in the axillæ of the present year's leaves. Scallop-budding may be done almost at any season. Buds should be taken from the middle of the shoot; those from its point are said to make wood too freely, and those from the base to be more unexcitable, and consequently less prompt to vegetate.

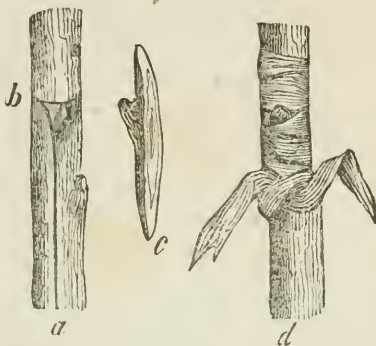
Stocks for budding may be much smaller than for grafting, even on the same year's shoot. Several buds may be inserted on older branches, and thus a good head be obtained at once. On stocks of long standing, scallop-budding is to be adopted. Just after rain, and when there is no violent wind, is a time to be preferred for budding. Whatever mode of budding is adopted, quick-

ness in the operation is indispensable, for if the wound in the stock or that of the bud becomes dry, the budding will fail. The bark of the stock should be cut and raised first, and if possible on its north side. A piece of moist bass may be twisted over the wound whilst

the bud is preparing, and the moment this is done, it should be inserted, and the ligature put on forthwith.

There are twenty-three modes of budding described by M. Thouin, but only one—shield-budding, (Fig. 22)—is generally practised in Great Britain and

Fig. 22.



the United States. The annexed cut will convey a tolerably clear idea of the process; *a* is the stock or tree to be budded. *Shield-budding and Scallop-budding*:—"With the budding-knife make a horizontal cut across the rind, quite through to the firm wood at *b*; from the middle of this transverse cut make a slit downward perpendicularly, an inch or more long, going also quite through to the wood. This done, proceed with all expedition to take off a bud, holding the cutting or scion in one hand with the thickest end outward, and with the knife in the other hand enter it about half an inch or more below a bud, cutting near half way into the wood of the shoot, continuing it with one clean slanting cut about half an inch or more above the bud, so deep as to take off part of the wood along with it, the whole about an inch and a half long, represented by *c*; then directly with the thumb and finger, or point of the knife, slip off the woody part remaining to the bud; which done, observe whether the eye or gem of the bud remains perfect; if not, and a little hole appears, in that part it is imperfect or, as gardeners express it, the bud has lost its root and another must be prepared. If, however, it is found imprac-

ticable to remove this woody part without leaving a hole, let it remain, it is not absolutely objectionable. When the bud has been thus prepared, slip it down between the wood and bark to the bottom of the slit; the next operation is to cut off the top part of the shield, even with the horizontal first-made cut, in order to let it completely into its place, and to join exactly the upper edge of the shield with the transverse cut, that the descending sap may immediately enter the bark of the shield, and protrude granulated matter between it and the wood, so as to effect a living union. The parts are now to be immediately bound round with a ligament of fresh bass, previously soaked in water to render it pliable and tough, beginning a little below the bottom of the perpendicular slit, proceeding upwards closely round every part except just over the eye of the bud, and continuing it a little above the horizontal cut, not too tight, but just sufficient to keep the whole close, and exclude the air, sun, and wet, as represented at *d*. If the stock and bud are both in fit condition, budding is usually performed with uniform success: it is a simple mechanical operation, and those accustomed to the work execute it with great rapidity; an ac-

tive nursery-hand will readily insert 1000 buds in a day. In most of the New Jersey nurseries boys are employed for budding peaches, and by much practice become perfect adepts at it. The mode just described is called shield or T budding, from the shield-like form of the portion of bark containing the bud to be inserted, and the resemblance which the horizontal and perpendicular cuts made for its admission into the stock, bear to the two principal bars of the letter T.

"In selecting buds, those that are very young should be avoided; for in that case they are closely connected with the greenish substance composing the pith at the tender age of the shoot producing them; and on this substance they then doubtless too much depend for nourishment to be safely deprived of it.

"It is a sign that they are duly constituted when they begin to emit woody substance; and this will form a criterion of their fitness to shift for themselves.

"Buds taken from fruit-bearing trees on walls are apt to fall, owing to the prevalence of blossom-buds which will not produce shoots.

"*Scallop-budding* consists in paring a thin tongue-shaped section of bark from the side of the stock; and in taking a similar section or shield from the shoot of buds, in neither case removing the wood. The section or shield containing the bud, is then laid on the corresponding scallop in the stock; its upper edge exactly fitted as in shield-budding, and at least one of its edges as in whip-grafting—after this it is tied in the usual way. The advantages of this mode are, that it can be performed when the wood and bark do not separate freely; on trees having very stiff, thick, suberose bark, and at any season of the year. Its disadvantages are, that it requires longer time to perform the operation, and is less certain of success."

"Mr. Knight was accustomed on some occasions to employ two distinct ligatures to hold the bud of his peach trees in its place. One was first placed above the bud inserted, and upon the transverse section through the bark; the other, which had no further office than that of securing the bud, was employed in the usual way. As soon as

the bud had attached itself, the ligature last applied was taken off, but the other was suffered to remain. The passage of the sap upwards was in consequence much obstructed, and buds inserted in June began to vegetate strongly in July. When these had afforded shoots about four inches long, the remaining ligature was taken off to permit the excess of sap to pass on, and the young shoots were nailed to the wall. Being there properly exposed to light, their wood ripened well and afforded blossoms in the succeeding spring."

In the first week of July the thorns should be removed from those places on the stocks intended for budding roses. If they be not taken away, the operation is rendered needlessly troublesome; and it is best done then, as time is thus allowed for the bark's healing. The best time for budding the rose is towards the end of that month; a dormant eye being employed just after a fall of rain, and when no strong dry wind is moving. An attention to these circumstances ensures that the sap is flowing freely, and avoids a rapid evaporation so often preventing success. Moist bass is usually employed for closing the wound of the stock, but it is far preferable to use worsted, and over this a coating of the grafting wax, made according to the following recipe:—

Burgundy pitch	1 oz.
Common pitch	4 "
Yellow wax	4 "
Tallow	2 "
Nitre (carbonate of } potash) powdered . }	1 "

These must be melted slowly in an earthen pipkin, and applied whilst warm. Common diachylon sold in rolls by chemists answers as well as the above. A laurel leaf fastened at each end by a ligature round the stock, so as to arch over the bud, will complete the arrangement, and thus the sun's rays, the air, and wet, will be most effectually excluded, the admittance of any one of which are fatal to the union of the bud with the stock.

The great point is to apply the ligature firmly without cutting the bark, and to relax and re-tie it, when, after some time, the bark shall be found swelling a little over it. It is not desirable to remove the ligature finally, until, from the greenness and plumpness of the bud, and the slight swelling

which takes place in it, evidence is had that the operation has succeeded.

Within a fortnight after the bud has been inserted, its fresh swelling aspect will intimate if it has united to the stock. At the end of the third week, if bass or worsted have been used as ligatures, these must be loosened, and in about ten days more removed. Very early in the spring following, the heads of the stocks must be removed by an oblique cut terminating about one-eighth of an inch above the shield of the bud, or six inches of the stock may be left for the first year, to which to fasten the shoot as a support.

BUDDLEA. Twelve species. Stove or green-house evergreen shrubs. *B. globosa* is hardy. Layers or cuttings. Loam and peat.

BUFF-TIP MOTH. See *Bombyx*.

BUGINVILLÆA spectabilis. Stove evergreen climber. Cuttings. Loamy soil.

BUGLE. See *Ajuga*.

BUISSON, is a fruit tree on a very low stem, and with a head closely pruned.

BULBINE. Twenty-one species. Chiefly green-house herbaceous perennials. *B. frutescens*, *B. rostrata*, *B. suavis* are evergreen shrubs; *B. bisulcata*, is a hardy bulb. Cuttings, offsets, suckers. Sandy loam or rich mould.

BULBS, are really underground buds; their fibrous or real roots die annually, but the bulbs remain stored with elaborated sap, and retaining, though latent, the vital powers of the plant, ready for reproduction at the appropriate season. Beside root bulbs, as are the onion, crocus, &c., there are stem or culinary bulbs, equally efficient for propagation.

The culinary bulb consists of a number of small scales closely compacted together in an ovate or conical form, enclosing the rudiments of a future plant, and originating sometimes in the axil of the leaves, as in *Dentaria bulbifera* and several liliaceous plants, and sometimes at the base of the umbel of flowers, as in *Allium carinatum* and others, in both which cases it is nourished by the parent plant till it has reached maturity, at which period the bond of connexion is dissolved, and the bulb falls to the ground, endowed with the power of striking root in the soil by

sending out fibres from the base, and so converting itself into a new individual. Every bulbous-rooted plant has some peculiar point in its management, but there are a few rules of general applicability. They should never be moved except whilst in a state of rest; this occurs to the summer-flowering bulbs in autumn, and to the autumn-flowering in early summer. They require to be taken up annually, or at farthest every second or third year, to remove the accumulated offsets. No bulb should be kept out of the ground for more than a month, and even during that time it is desirable to keep it from drying by burying it in sand.

"Some bulbs," says Mr. Loudon, "multiply so fast by throwing out offsets, that they soon cease to send up flower stems. Of these may be mentioned the *Ornithogalum umbellatum luteum*, and some other species; some species of *Scilla Muscari*, *Iris*, *Allium*, *Oxalis*, and others. These should either be annually taken up, their offsets removed, and the parent bulb replanted, or the offsets, as soon as they send up leaves, should be destroyed. Indeed, whenever strong blowing bulbs is the principal object, the offsets should never be allowed to attain any size, but as soon as they indicate their existence by showing leaves above ground, they should be removed with a blunt stick, or in any way least injurious to the parent. By this practice a great accession of strength is given to the main plant, both for the display of blossom during the current season, and for invigorating the leaves to prepare and deposit nutriment in the bulb for the next year. In pursuance of the same objects, every flower should be pinched off as soon as it begins to decay, but the flower-stalk may remain till it begins to change colour with the leaves."—*Enc. Gard.*

"The rule to observe with newly imported bulbs, is to place them where they absorb moisture very slowly. The driest earth is full of water, which can only be driven off by the application of intense heat. A bulb, therefore, should be planted in what is called dry soil, and placed in a shady part of a green-house until it has become plump and begun to shoot. If it has begun to shoot when received, still the same

treatment should be observed, and the driest soil used to plant it in.

"It is only when decisive signs of natural growth can be detected that a very little water should be given, while the temperature is at the same time slightly increased; and no considerable quantity of water should be administered until the leaves are an inch or two above ground, and evidently disposed to grow rapidly. If these precautions are taken, no failures are ever likely to occur; if neglected, no success can be anticipated.

"To this class belong the numerous beautiful tribes of *Gladiolus*, *Ixia*, *Sparaxis*, *Watsonia*, &c., all of which are so closely allied, that the same treatment is applicable to the whole of them. To these may be added the *Hyacinth*. The two principal points to be attended to in the successful cultivation of the *Gladiolus* and *Ixia* are, to protect the beds in which the bulbs are planted from frost and from heavy rains, both of which are equally destructive. For both tribes, the beds should be composed of prepared soil, at least one foot deep, with perfect drainage at the bottom.

"That for *Gladioli* should consist of two parts turfy loam, one of leaf mould, and the remainder of well-rotted cow dung and sand. For *Ixias*, the greater portion of the soil should be formed of sandy peat without any manure.

"In both cases the beds may be made level with the surrounding surface, and towards the latter end of this month the bulbs may be planted upon them in rows, six inches apart each way; when covered over with soil, the beds will thus be raised a few inches above the bulbs; a small pyramid of sand should be formed over each, to assist in protecting them from damp. *Gladioli* should be covered three inches with soil; *Ixias* not more than two inches.

"After planting, a layer of dry decayed leaf mould, or tan from a spent bark bed, should be spread three inches thick over the beds.

"Either of these will resist the rain for some time; but if there should be a continuance of wet, the beds should also be protected with mats secured upon hoops. The tan or leaves will likewise assist materially in excluding frost. When, however, this sets in severely, dry leaves should be laid over

the surface to the depth of nine inches or a foot.

"As spring advances, these materials may be gradually removed, and all the care that will be afterwards required, will consist in tying up the flower-stems as they increase in growth. Unless the weather is very dry the beds will not need water; if such should be the case it should be liberally supplied, since the want of moisture in the growing season is just as destructive to *Ixias*, as a superabundance of it during their period of rest. If such beds are kept dry in winter, they will last for many years without replanting.

"There are many more interesting bulbs upon which it is needless here to dwell, as they will for the most part thrive in the borders amongst other plants.

"These are the *Erythronium dens canis* and *americanum*; *Tigridia pavonia*; *Pardanthus chinensis*; *Zephyranthes Atamasco* and *candida*; *Fritillaria imperialis* and *meleagris*; *Leucorum æstivum* and *pulchellum*; *Scilla amœna*, *campanulata* and *præcox*; *Asphodelus ramosus*, *tauricus* and *lacteus*; *Van Thol*, *Sans eye* and *Parrot tulips*; *Ornithogalum pyramidale*," &c.

BULBOCODIUM. Two species. Hardy bulbous perennials. Offsets. Sandy loam and peat.

BULLACE TREE. *Prunus insititia*.

BULL GRAPE. *Vitis rotundifolia*.

BULLIARDA vaillantii. Hardy aquatic annual. Seeds. Loam and peat.

BUMELIA. Fourteen species. Stove evergreen trees, or hardy deciduous shrubs or trees. Cuttings. Loamy soil, or loam and peat.

BUNCHOSIA. Eleven species. Stove evergreen shrubs. Ripe cuttings. Loam, sand and peat.

BUPTLEURUM. Forty species. Chiefly hardy annuals, biennials, perennials, and a few evergreen shrubs. Offsets or seeds. Common soil.

BUPHTALMUM. Nine species. Hardy annuals and perennials, or greenhouse evergreen shrubs. For the greenhouse species, cuttings, loamy soil. For the herbaceous species, suckers, common soil. The annuals merely require sowing in the open ground.

BURCHARDIA umbellata. Greenhouse herbaceous perennial. Offsets or division. Sandy peat, or peat and loam.

BURSERA. Two species. Stove evergreen trees. Cuttings or seeds. Loam and peat.

BURTONIA. Four species. Green-house evergreen shrubs. Cuttings. Very sandy loam and peat.

BUSHEL. See *Basket*.

BUTEA. Three species. Stove evergreen shrubs. Cuttings. Loam and peat.

BUTOMUS. Flowering Rush. Two species. Hardy aquatic perennials. Division. Rich loam.

BUTTER AND EGGS. See *Narcissus*.

BURCHELLIA. Two species. Stove evergreen shrubs. *B. capensis* is easily propagated either by cuttings of the roots or seed, in very sandy loam and leaf mould. It requires close pruning to restrain over luxuriance.

BURLINGTONIA. Two species. Stove epiphytes. Division. Wood, with a little moss.

BURNET. *Poterium*.

BURN ONION. See *Potato Onion*.

BURSARIA spinosa. Green-house evergreen shrub. Cuttings. Sandy loam and peat.

BUTTERFLY. The caterpillars of some of these insects are very injurious to the gardener, though those of the moth are still more numerous and destructive. The butterflies which are the chief causes of mischief in our gardens are *Pontia brassica*, *P. rape*, *P. napi*, and *Pieris crategi*. The smells of coal tar and of gas lime are particularly offensive both to butterflies and moths, and those may be readily strewed about the plants liable to become the depositories of their eggs. If shreds of flannel are placed in the branches of gooseberries, or among cabbages, &c., the parent insects are said to place their eggs there in preference to the leaves.

BUTTERFLY-PLANT. *Oncidium Papilio*.

BUTTON FLOWER. *Gomphia*.

BUTTON TREE. *Conocarpus*.

BUXUS. Four species and many varieties. Chiefly hardy evergreen shrubs. Suckers or layers. Common soil. See *Box*.

BYBLIS liniflora. Green-house aquatic perennial. Seeds. Loamy soil, and immersed in water.

BYRSONIMA. Thirteen species. Stove evergreen shrubs or trees. *B. volubilis* is an evergreen twining plant.

Ripe cuttings. Rich soil, or loam and peat.

BYSTROPOGON. Four species. Green-house evergreen shrubs. Cuttings. Loam and peat.

CABBAGE. (*Brassica oleracea capitata*.) "The cabbage tribe is, of all the classes of cultivated vegetables, the most ancient, as well as the most extensive. The *Brassica oleracea* being extremely liable to sport or run into varieties and monstrosities has, in the course of time, become the parent of a numerous race of culinary productions, so various in their habit and appearance, that to many it may not appear a little extravagant to refer them to the same origin.

"We have made our selection from the many which abound; it embraces the earliest, the latest and those which ripen immediately, and have been chosen on account of their superior worth and suitability for the peculiarities of our climate; having found from experience, that some varieties highly esteemed in Europe, are not so desirable in this country. Short descriptions of the kinds we are cultivating, may prove interesting to those who lack knowledge of the subject, and seek information.

"*The Early York* is the earliest variety, (with the exception of the *early dwarf*, which is very small, and not worth growing to any extent.) It is a delicious tender cabbage, and well known to all possessing any knowledge of gardening. Those from American seeds produce heads firmer and larger than is produced by the imported. The entire crop does not ripen so nearly together as the imported, in which respect it is also superior; for whilst some among them will be as early as the earliest of the imported, others will succeed them, thus answering better for family use; and for the market it is also an advantage, those coming in last being of an increased size and hardness. It is, moreover, hardier than the imported, and having become acclimated, withstands the heat better, which gives it a great advantage over the foreign, especially at the south.

"*Method of cultivation at Philadelphia.*

—Sow the seed from about the 10th to the 20th of September. If sown earlier, the plants are apt to "shoot," and if later, may not get sufficiently strong to stand the winter. That the seed may

vegetate freely, observe the directions for sowing *Broccoli*. About the latter part of October, remove them to a spot of ground previously prepared in which they are to be preserved during the ensuing winter. Such situations should be protected from northerly winds, and lay exposed to the south. The best way is to set a frame, provided with a shutter, in which plant them with a dibble, allowing each plant an inch square. In this situation suffer them to remain without cover, until the middle or close of November, according as the season may be mild or otherwise. Have the shutter at hand to use on any sudden cold; it may be slid on at night, and removed in day time, either entirely or partially, as the weather may require throughout the winter; air them freely in clear weather when not too cold, and examine them from time to time, to guard against the depredations of mice which sometimes harbour in the frames. As early in the latter part of March or beginning of April, as the weather will permit, and the ground admit of being worked, set them out in a compartment of the garden protected from northerly blasts. The ground should be deeply dug and manured very highly with well rotted stable dung; *the richer the earth is, the more luxuriant will be the growth, and earlier the crop.*

"Should the fly attack them, give frequent sprinklings of wood-ashes and air-slaked lime, previously watering the plants that it may adhere; or if practicable sprinkle with a solution of soap. If any run to seed remove them, and supply their place with fresh plants. It is scarcely necessary to add, that frequent deep hoeing should be given, to destroy weeds and loosen the earth, that it may receive the dews; when they have attained a sufficient size earth them up, that they may the more effectually withstand drought.

"The market gardeners around Philadelphia, plant out considerable quantities of Early York in the autumn, to stand over winter; their plan is to prepare a piece of ground with a southern aspect; throw up ridges of a foot high, two and a half feet apart, running from N. W. to S. E., about half way up the side of the ridge, and on the southerly side they place the plants, putting them in the ground so deeply that nothing but the heart and upper

leaves are exposed. This is done about the middle of October. When cold weather approaches, they give a slight covering of straw, brush, or corn-stalks; spread from ridge to ridge. Should the winter prove mild the plants will succeed very well, and come into head before those planted in the spring. The covering is removed the latter end of March or beginning of April, and the ridges gradually cut down to a level by the culture of the crop—deep tillage is essential to success with this vegetable.

"Having neglected to sow in September, or from any accident having failed to get the plants at that time, prepare a hot-bed in February, and therein sow the seed, by itself, or mixed with celery, radishes, or lettuce.

"*Landreth's Large York*.—This is a variety that originated at Philadelphia. It is not what gardeners term a pure kind; that is, the heads differ somewhat in form; but it is one of the finest varieties we are acquainted with. When planted at the same time with the Early York, it immediately succeeds it. For the market it is a profitable kind, the heads being large, firm, and heavy. It differs from what is known in England as the "Large Early York," that being termed here the Early York. Mode of cultivation same as that of the Early York.

"*Early Sugarloaf*—has a conical formed head, hence its name. It never becomes firm and hard, and is principally used for boiling; is esteemed a delicate variety; ripens with the Large York; is but little cultivated around Philadelphia. Treatment same as for the York.

"*Early Battersea*—is in high repute in England as a second early variety.

"*Philadelphia*—a variety which originated near the city of its name. It succeeds the Large York; produces a firm compact head, of large size, and is a profitable kind for market: the whole crop not ripening at once, but heading successively; it withstands the heat well, and with Landreth's Large York forms the main early summer crops of extensive gardeners who supply the Philadelphia market.

"*Large Drumhead*—*Flat Dutch*—*Large Bergen*—*Drumhead Savoy*—*Curled Savoy*—These are all calculated for the winter supply. The first three

produce firm, large heads, and differ but little. The Drumhead has a large roundish head; the Dutch is flattened on the top; the Bergen somewhat resembles it, with short stalk, heading near the ground. The Savoys have curly leaves, and are much preferable to the others for boiling; are very tender and delicately flavoured when touched by the frost. The *Drumhead Savoy* has been introduced of late years. The head is nearly as large as the Drumhead, firm and compact—hence its name. It keeps well throughout the winter, and until very late in the spring, and is decidedly worthy of general culture, having all the delicacy of the curled variety. Time of sowing winter cabbage is April and May, to be transplanted in June and early part of July, choosing cloudy weather, when it looks likely for rain. An occasional watering in dry weather will assist them in taking fresh root.

“To preserve them during winter.—In November remove them to a sheltered situation, burying the entire stalk, so that nothing but the heads remain above ground. In December give a slight covering of straw, with brush laid on to prevent its blowing off. In this manner they will keep well throughout the winter—the Savoys until late in the spring.

“*Late Battersea*—cultivated in England for an autumnal crop—but little grown here, having been superseded by other kinds.

“*Red Dutch*—is used principally for pickling, either with other vegetables, or shredded by itself as “slaugh.” For early summer supply sow in September, as directed for Early York, and in April and May for the autumn and winter stock, treating as directed for Drumhead and Savoy.

“*Green Glazed*—grown extensively at the south, where it is thought to resist the worm; does not succeed well in this latitude. Culture similar to the other summer varieties.”—*Rural Register*.

The cabbage is liable to the *Mildew* and *Ambury*, which see.

CABBAGE BUTTERFLY. See *Pontia*.

CABBAGE FLY. See *Anthomyia*.

CABBAGE GARDEN PEBBLE MOTH. See *Pyralis*.

CABBAGE MOTH. See *Mamestra*.

CACALIA. Chiefly stove evergreen shrubs and trees, or hardy herbaceous perennials; some are annuals. *C. bicolor* is deciduous; *C. radicans*, an evergreen creeper; *C. scandens*, an evergreen climber. Cuttings. Division. Sandy loam.

CACTUS. Four species. Stove evergreen shrubs.

Soil.—“The soil for young plants, one-half peat, with equal quantities of strong yellow loam, pigeons’ or sheep’s dung, and river sand that has been at least exposed twelve months to the weather, and frequently turned. Never mix the soil before it is wanted for use. Well sift, and the lumps place over the potsherds for drainage. When the plants have attained a proper size for blooming, add more of the loam in repotting them, particularly to *C. speciosissimus*, and in all cases give plenty of drainage.”—*Gard. Chron*.

Sowing.—“Fill the seed-pots with cinders, to within two inches of the top, and make them up with very sandy peat, and a little clean sand on the top; the pots are then watered and the seeds sown; after which as much dry sand is sprinkled over them as will just fill up the spaces between them. The whole is then pressed down gently, and the pots are put by in any warm place, where they are kept moist. The seeds will vegetate in ten or twelve days, and must then be very gently watered, for fear of displacing them, till they make their little roots and get firm hold of the soil; after which they may be freely and regularly watered. The seeds to be sown quite thin in the first instance, and not to transplant the seedlings till they begin to get crowded in the pots, in a year or two. These directions are equally applicable to the seeds of other succulents.”—*Gard. Chron*.

Dr. Lindley adds, that “the best way to bloom *C. speciosus* and *speciosissimus*, is to grow them in an enriched soil, and keep them in a warm, light house, while they are making their shoots, exposing them entirely during August and September. By the latter practice they will become brownish and unhealthy-looking for a time, though they will soon recover this.”—*Gard. Chron*.

“The seeds of cacti may be gathered and sown as soon as they are ripe.

Being produced in a large pulpy berry, this never bursts of itself; but its appearance will tell you when it is mature. All the treatment they require is, to remove the pulpy matter from them, and this may be best done by washing."—*Gard. Chron.*

Grafting.—The end of August is the best time for this operation, and Mr. Green, already quoted, gives these directions:—

"I grow for stocks, *Pereskia aculeata*, *Cereus hexagonus*, and *Cereus speciosissimus*. I prefer the latter on account of its hardy, lasting, and robust habit. I grow the stocks freely till they attain the height that I want them. Some I grow with five or six stems, from one to five feet high; others I grow with one stem, from one to four feet. The short stems I engraft at the top with the *Emphyllum speciosum*, and *Ackermannii*; the tall single stems with *E. truncatum*, and some from the surface of the soil to the top, all of which is of course according to individual fancy; *E. truncatum* should always be engrafted high, without which, from its drooping habit, the greater part of the beauty of the bloom is lost. The shoots to be about one and a half or two inches long. I pare off the outer skin or bark for about half an inch at the base of the graft, and cut what is intended to be inserted into the stock in the shape of a wedge; I then make an incision in the angles or top of the stock with a pointed stick, made the same shape as the scion.

"When the grafts are first put in, to prevent their slipping out, I pass through each a small wooden peg, or the spine of a thorn; I then cover each with a small piece of moss, and place them in a shady, damp house, and syringe them over the tops occasionally in the evening; they will all adhere to the stocks in ten days or a fortnight, and make good plants by winter. By engrafting the showing kinds of cacti on the stocks that I recommend above, noble specimens can be grown in a few years, from one to ten feet high if required, and the size and colour of the blooms are much superior to what they ever produce when grown on their own roots. *E. truncatum*, by the above treatment, becomes quite a hardy greenhouse plant, and will bloom three months later than it does when grown

in the stove on its own roots in the usual way."—*Gard. Chron.*

Varieties and Species.—The following are cultivated around Philadelphia, and are among the more desirable. A superb collection, perhaps the most so in the Union, is in the possession of Caleb Cope, President of the Pennsylvania Horticultural Society:

- Cereus grandiflorus.*
- *monstrosus.*
- *cylindricus.*
- *Mallisonia.*
- *Smithii.*
- *flagelliformis.*
- *horrida.*
- *gladiata.*
- *gemmatus.*
- *speciosissimus.*
- *heptagonus.*
- Epiphyllum speciosa.*
- *splendens.*
- *Jenkinsonia.*
- *truncatus.*
- *Russellianus.*
- *atropurpurea superba.*
- *vandesia.*
- Mammillaria prolifera.*
- *Wildeana.*
- *rhodantha.*
- *stellata.*
- *radiata.*
- *rubra.*
- Echinocactus Eyreisii.*
- *decora.*
- *ottonis.*
- *dis-color.*
- *simplex.*
- *pulchella.*
- Opuntia, microdysa.*
- , *leucacantha.*

Cuttings and Culture.—"The best time for propagating by cuttings is when the plants are growing freely; make them of whatever size can be spared from the plants; and those that are of young and unripe shoots, lay on a dry shelf in the green-house for a fortnight to dry up the sap, which prevents them from rotting, and causes them to emit roots much sooner. Plant them singly in small pots, and place them in a moderate hot-bed frame; when they have filled the pots with roots, re-pot and place in an intermediate, or pelargonium-house, to remain for the summer, and receive a good supply of water.

"In the autumn allow them to get

quite dry, and winter in a dry, airy part of the green-house. In spring, again remove to the pelargonium-house, and use a very little water, which increase as the season advances.

“By the end of the second summer they will have grown to the size of good blooming plants; and in the autumn they should be placed out in a warm airy part of the garden, to ripen the shoots thoroughly.

“About the usual time of housing other green-house plants they should be again dried, and put, as before, in the green-house; place the first for forcing in the intermediate stove about the 1st of February, and continue a succession, till they bloom in the green-house, which is about June.

“Such plants will bear the greatest extremes of dryness and moisture, and without proper attention is paid at the season of rest to keep them quite cool and dry, they never will bloom properly. The forcing must be commenced at a low temperature, and water at first given sparingly.

“When they have begun to grow freely, and the bloom-buds are well started, they must be watered, not by a continued dripping, but by copious applications, and at intervals of a fortnight, during the growing season, with liquid manure.

“When the bloom-buds are sufficiently advanced, thin out all those which are large and small, leaving them as near one size as possible, and at proper distance to allow the blooms to expand. When they have flowered, keep the plants rather dry for a short time, and place them in a cool shady part of the green-house, or under a north wall. In a few weeks they will again assume their usual firm and healthy appearance, and begin to grow; and then clear off all the decayed blooms and seed-pods, and place the plants for the autumn in the garden in a south aspect, where there is a free circulation of air, giving them a good supply of water; after this they are moved to the green-house and treated as before. Train them to iron stakes, made to fit the outside of the pots or tubs, and fasten them with wire. Attention should be paid to early training, and to stopping all shoots as soon as they attain the required height; all useless side and bottom shoots rub off, and

occasionally some of the old shoots cut out, and replace with young ones.”—*Gard. Chron.*

CADIA purpurea. Stove ever-green shrub. Cuttings. Light loamy soil.

CÆLESTINA. Three species.—Green-house and half-hardy perennials. *C. micrantha* is a half-hardy evergreen shrub. Seeds. Common open soil.

CÆNOPTERIS. Five species. Stove and green-house ferns. Division. Peat and loam.

CÆSALPINA. Twenty-one species. Stove evergreen shrubs or trees. *C. scandens* is a climber; *C. gilliesii* is deciduous. Seeds. Sand, peat and open loam.

CÆSIA vittata. Green-house tuberous-rooted perennial. Seeds. Sandy loam and peat.

CALABASH. *Crescentia*.

CALABATREE. *Calophyllum calaba*.

CALADENIA. Ten species. Half-hardy, or stove orchids. Division. Peat, loam, and sand.

CALADIUM. Twenty-eight species. Chiefly stove herbaceous perennials or evergreen shrubs. Tubers. Rich soil. Some grow best in water; *C. simsii* is a climber.

CALAMINTHA. Nine species. Chiefly hardy herbaceous perennials; two are evergreen shrubs. Suckers. Light loam.

CALAMPELIS scabra. Half-hardy evergreen climber. Cuttings. Light loam.

CALAMUS. Six species. Palms. Seeds. Rich sandy loam. A moist atmosphere suits them.

CALANDRINIA. Seven species. Stove, green-house, or hardy herbaceous plants. Seeds or cuttings. Loam and peat.

CALANTHE. Nine species. Stove or green-house orchids. Division. Peat and loam.

CALASHEA. Eleven species. Stove herbaceous perennials. Division. Sandy peat.

CALATHIAN VIOLET. *Gentiana pneumonanthe*.

CALCAREOUS SOIL is a soil in which chalk (carbonate of lime) predominates. When in great excess it renders the colour a near approach to white, in proportion to that excess. No soil is productive which does not contain some chalk, or in which it exceeds

nineteen parts out of twenty. From one to five per cent. is the usual proportion in fertile soils. Calcareous soils are rarely productive; they are so feebly retentive of moisture that the crops upon them are burnt up in summer; and they reflect the sun's rays so fully, that vegetation is late upon them in spring. The best addition to such soils, to improve their staple, is clay.

CALCEOLARIA. Thirty-one species, and many varieties. Chiefly greenhouse herbaceous perennials, or evergreen shrubs. Cuttings or seeds. Any rich, open, sandy soil.

Characteristics of Excellence.—"The plant should be shrubby; the foliage thick, and dark green; the habit bushy; the wood strong.

"The flower-stems should be short and strong; the foot-stalks of the blooms elastic, and branching well away from each other, to form a rich mass of flowers without crowding.

"The individual blooms depend entirely on the form of the purse, and it should be a perfect round hollow ball.

"The orifice and calyx cannot be too small, nor the flower too large. The colour should be very dense, and whether it be a spot in the middle, or stripes or blotches, should be bold and well defined, and the ground should be all one colour or shade, whether white, straw-colour, sulphur, yellow, or any other. The colour of a self should be brilliant, and all over the same actual shade. Dark flowers, with pale edges, or clouded or indefinite colours, are bad, and unfit to show. The bloom should form one handsome bunch of pendant flowers, which should hang gracefully, and be close to each other; the branches of the flower-stems holding them out to form a handsome spreading surface."—*Hort. Mag.*

Raising from Seed.—"The pods should be taken off when turning yellow, and laid to dry on a large sheet of paper, under a hand-glass, that the wind may not disturb it. In the early spring this may be sown thinly in pans well drained with crocks, and covered with a hand-glass, in the greenhouse or under the glass of a garden-frame; when they have attained a sufficient size to handle, they may be pricked out into other seed-pans, an inch apart, and allowed to grow until they are large enough to be in each other's way. They

may then be potted in sixty-sized pots, and placed in a pit or frame, there to grow, under tolerably attentive management as to being kept neither dry nor wet. If the green-fly make its appearance, they must be fumigated with tobacco smoke, not too strongly, as it has been known to kill all the young shoots. If the roots reach the sides of the pot, and begin to mat a little, they may be changed to size forty-eight; and if they should after that grow still stronger, they may be once more shifted to size thirty-two, in which they will bloom to great advantage."—*Hort. Mag.*

Cuttings and Division.—"About the middle of July, when the plants have done flowering, preparation should be made for propagating the different kinds—the herbaceous, by dividing the roots; the shrubby, by cuttings. The plants should be encouraged in their growth, a short time previously to this operation, by judicious watering, the remaining flowers picked off, and the stems allowed to die down, that no nourishment may escape. The cuttings from the shrubby sorts should be struck singly in small sixties, in a frame with a gentle bottom heat, kept shaded, and rather sparingly watered; when rooted, air may be more freely admitted, and the plants gradually hardened. As soon as the roots appear through the soil, they will require shifting into forty-eights, and to be placed in a house where they may receive plenty of top air, side air and drafts being prejudicial to the free growth of the Calceolaria; when the sun bears considerable power, the plants should remain on the shady side of the greenhouse; the temperature of the house should be from 45° to 50°."—*Gard. Chron.*

Layering.—A writer in the same work, who thoroughly understands his subject, says:—"At the time they have done flowering, which is under ordinary circumstances about the latter end of June, divest them of their flower-stalks and dead leaves, and top-dress them for about an inch deep, with silver-sand and yellow loam in equal portions, taking care that all the ripe joints of the young shoots are covered for about half that depth; place them in a cool and shaded situation, until the beginning or middle of September, giving occasional waterings during that period. By this time most of the shoots so co-

vered have rooted so as to permit of their being removed with safety from the parent plant."—*Gard. Chron.*

Potting.—The same authority says on this point of their culture:—"Plant them in forty-eight sized pots, or smaller if necessary, and place them in a frame, on a gentle bottom heat of tan, taking care at this period to guard against the direct influence of the sun, until they are fairly established in their pots.

"The compost for the first potting is, three parts of yellow loam, four of well decomposed leaf-mould, one of cow-dung which has lain at least twelve months, and two of silver-sand. This soil to vary as the plants strengthen and approach their flowering season, until the proportions are five of loam, two of leaf-mould, two of cow-dung, and one of silver-sand. From the time the plants are well established in their pots, give them no particular attention beyond that of slightly fumigating them once a week, until about the beginning of January, when shift them into larger pots, and place them on the front stage of a geranium house, the temperature of which is kept at about 45°, with an exceedingly humid atmosphere. In shifting always sink the ball a little to admit of a top-dressing of fresh mould being put over the ripe joints of the young wood, which very soon emits roots; an operation which tends materially to increase the size and strength of the plants. Be very particular in drainage, never allowing a particle of the old drainage to be removed, and by the time they are placed in their flowering pots, have a complete open drain, from within a few inches of the surface, down to the bottom of the pot, with the exception of the layers of fresh turf, which always introduce between the mould and potsherds."—*Gard. Chron.*

CALDASIA heterophylla. Stove annual. Seeds. Sandy peat and loam.

CAL EA. Three species. Stove evergreen shrubs. Cuttings. Loam and peat.

CAL EACTE urticifolia. Stove evergreen shrub. Cuttings. Common soil.

CALEANA. Two species. Greenhouse orchids. Division. Peat, loam, and sand.

CALENDULA. Marigold. Twenty-one species. Hardy annuals or green-

house evergreen shrubs. Cuttings, seeds. Loam and peat.

CALEPINA corvini. Hardy annual. Seeds. Common soil.

CALLA. Four species. Chiefly greenhouse herbaceous perennials. *C. palustris* is an aquatic; *C. pertusa* an evergreen creeper. Seeds or division. Rich soil.

CALLICARPA. Twelve species. Chiefly stove evergreen shrubs. Cuttings. Loam and peat.

CALLICHROA platyglossa. Hardy annual. Seed. Common soil.

CALLICOMA serratifolia. Greenhouse evergreen shrub. Cuttings. Fibrous peat and sand.

CALLIGONUM pallasia. Hardy evergreen shrub. Cuttings. Sandy open loam.

CALLIOPEA aurea. Hardy herbaceous perennial. Division. Loamy soil.

CALLIOPSIS. Four species. Hardy annuals and perennials. Seeds. Common loam.

CALLIPRORA lutea. Hardy bulbous perennial. Offsets. Peat.

CALLISIA repens. Stove tuberous-rooted perennial. Division. Sandy fibrous peat.

CALLISTACHYS. Five species. Greenhouse evergreen shrubs. Cuttings. Sandy peat and loam.

CALLISTEMMA. Two species and many varieties. Hardy annuals. Seeds. Common soil.

CALLISTEMON. Nineteen species. Greenhouse evergreen shrubs. Ripe cuttings. Loam, peat, and sand.

CALLITRIS. Three species. Greenhouse evergreen trees. Seed. Sandy loam.

CALLUS is the matter exuded from the edges of the wound of a plant in the process of healing. It is exuded from the horizontally communicating cells of the plant; and in cuttings it is from and through this exuded matter that the roots and the perpendicular vessels connected with them proceed.

CALOCILUS. Two species. Greenhouse bulbous rooted orchids. Sandy peat and light loam.

CALOCHORTUS. Six species. Half-hardy bulbous perennials. Offsets. Sandy peat and loam.

Sowing.—Dr. Lindley says:—"The seeds should be sown as soon as ripe, or as soon as possible afterwards, in pans filled with very sandy peat; the

seeds covered rather more than a quarter of an inch in depth; and the pans placed in any cold pit secured from wet. They require only water enough to keep the soil damp during the winter. They will bear being placed in a warmer situation, but not where there is a moist heat. The young plants should be kept growing as long as possible, by keeping them rather moist during the summer. They must not be removed from the seed-pan until after the second too quickly, or kept dry too long, particularly the first season; at that time they are very small, and are apt to be dried up and exhausted, if care is not taken to prevent it."—*Gard. Chron.*

CALODENDRON capense. Green-house evergreen tree. Cuttings. Loamy soil.

CALOPHACA vulgarica. Hardy deciduous shrub. Division. Loam and peat.

CALOPHANES oblongifolia. Hardy herbaceous perennial. Division. Loam and peat.

CALOPOGON pulchellus. Greenhouse orchid. Division. Peat and loam.

CALOSTEMMA. Three species. Green-house bulbous perennials. Offsets. Sandy loam and peat.

CALOTHAMNUS. Four species. Green-house evergreen shrubs. Cuttings. Sandy peat.

CALOTIS cuneifolia. Green-house herbaceous perennial. Division. Common soil.

CALOTROPIS. Two species. Green-house evergreen shrubs. Cuttings or seeds. Rich soil.

CALTHA. Six species and many varieties. Hardy herbaceous perennials. Seeds or division. Common rather moist soil.

CALTROPS, Tribulus.

CALYCANTHUS. Five species. Hardy deciduous shrubs. Layers. Open loam.

CALYPSO borealis. Half hardy orchid. Offsets. Sandy loam and peat.

CALYPTRANTHES. Two species. Stove evergreen trees. Layers. Sandy peat.

CALYPTRION aubletii. Stove evergreen climber. Seeds. Peat and loam.

CALYSTEGIA. Seven species. Hardy deciduous twining or trailing plants. Division. Common loamy soil.

CALYTHRIX. Five species. Green-

house evergreen shrubs. Cuttings. Sandy loam and peat.

CAMASSIA esculenta. Hardy bulbous perennial. Seeds. Peat.

CAMELLIA Japonica. Green-house evergreen shrub.

Messrs. D. Landreth & Fulton, of Philadelphia, who are extensively engaged in the culture of this charming plant at the old Landreth Nurseries, where was made the earliest collection of the *Camellia* in America, present the following as a desirable selection. Those marked † are perfectly double, with the petals neatly arranged, and are among the choicest in cultivation. Those marked with a star are of American origin.

The catalogues of some European Nurserymen contain upwards of five hundred varieties; it may be readily presumed that many of them are comparatively worthless: a goodly number of such have been imported by the American florists, and though some of them were once esteemed, are now, by the introduction of more desirable varieties, no longer worthy a place in a choice collection. We append a list of a few such faded beauties.

CHOICE CAMELLIAS.

†Alba-pleno, double white.

†—Fimbriata, fringed do.

*Americana, blush with rose spots.

Albertii, white.

Althæiflora, crimson.

†*Amabile, rose and red.

†*Binneyii, light rose.

Bealii, large red.

Carswelliana, dark red.

Chandleri, white and crimson.

†*Caroline, pink.

Colvelleii, white with rose stripes.

†Concinna, dark red.

†Candidissima, purest white.

†Conspicua, large red.

†Coquette.

Campbellii, white and red.

Donklarii, white rose and crimson.

†Duchess de Orleans, crimson with white stripes.

†Exemia, salmon.

*Estherii, white and rose.

†Elegans, rose.

†Elata, crimson.

Eclipse, white with rose stripes.

*Floyii, rose red.

†Fordii, dark rose.

Fairlea, crimson.

- Fulgida, crimson.
 †*Feastii, white and rose.
 Gilesii, crimson and white.
 †*Gunnelli, white.
 *Grabamii, white.
 *Hosackii, crimson.
 †*Hempsteadii, dark rose.
 †Henry Favre, rose.
 †Imbricata, crimson and white.
 — Alba, white and rose.
 *Imbricata (*Dunlap's*).
 †Incarnata, Lady Humes'.
 Invincible, rose, red spots.
 Kingii, white, rose spots.
 Kermosina, crimson.
 †*Landrethii, rose and white.
 †*Martha (*Buist's*), white.
 Mutabilis, changeable crimson.
 †Myrtifolia, light red.
 Mutabilis triversi, rose.
 †*Mrs. Fetter's, rose and white.
 Ochraleuca, white.
 *Philadelphia, rose red.
 †*Prattii, light rose.
 Pomponia, white.
 Queen (*Fielder's*), light rose
 Reticulata, rose.
 †Rosea, rosy purple.
 Rex Batavia, white, rose striped.
 Rubro-pleno, old red.
 †Sasanqua rosea, light rose.
 Sweetii, rose, spotted with red.
 †Sacoï vera.
 Speciosa, crimson and white.
 — *Cunningham's*, rose and
 white.
 *†Sarah Frost, dark red.
 Spicata, red.
 †*Sherwoodi, crimson and white.
 Tricolor, white rose and crimson.
 Triumphans, rose spotted with white.
 Thea, black tea.
 Vandesia superba, crimson.
 Variegata, rose and white.
 Viridus, green tea.
 †Victoria (*Priestley's*), red, white
 stripes.
 Welbankiana, greenish white.
 †William the 4th, rose spotted with
 white.
 †*Washington, white.
 Wardii, crimson.
- REJECTED CAMELLIAS.
- Alba simplex.
 Aitonia.
 Anemoniflora.
 — Rosea.
 — Alba.
 Atrorubens.
 Bruceana.

Corallina.
 Conchafiora.
 Celestina.
 Carnea.
 Decora.
 Dorsetia.
 Elphinstonia.
 Francofurtensis.
 Florida.
 Goussonia.
 Hendersonia.
 Juliana.
 Lawrenceana.
 Oleafera.
 Parksii.
 Pendula.
 Paeoniaflora.
 Rosa Sinensis.
 Rosa mundi.
 Sabina.
 Woodsii.

Soil.—The camellia delights in a rich soil, but will not bear manure directly applied. The following is the compost used at the Landreth Nurseries—sandy wood earth (the decomposed vegetable matter found at the roots of trees in forests) and well rotted sod, or loam, in equal parts, thoroughly mixed, and passed through a No. 1 sieve, retaining all the fibrous particles in the soil.

Propagation.—"The usual methods of propagation are by inarching or grafting and budding on the single red Camellia, cuttings of which are found to strike root more readily than of the double varieties.

"The cuttings are taken in July and August, or as soon as the young shoots are sufficiently ripe at the base. They are carefully prepared by being cut smoothly over with a sharp knife at a joint, and divested of one or two leaves at the bottom, and then planted firmly about two inches deep in pots half filled with the Camellia compost before described, and the upper half with fine white sand. They are then well watered, and the pots plunged in a tanbed, which gives out a gentle warmth, and kept closely shaded for three or four months, by which time short fibres, or a callus from which they afterwards diverge, are produced.

"When sufficiently rooted to bear removal, they are potted singly in small pots, the sand being then carefully removed; the pots should be well drained and filled with the Camellia compost, with the addition of a little white sand.

"They are afterwards to be sprinkled with water, and placed in a close frame or pit until they begin to root afresh, and by degrees exposed to the air. The succeeding season they may be potted in the same soil as the other Camellias, and similarly treated, and many of the plants will then have attained sufficient size and strength for inarching or budding, and all of them by the following season.

"The best time for *inarching* is early in the spring, just before the plants begin to grow, and for *budding* as soon as the new wood is sufficiently ripened; but it may be done at almost any season of the year."—*Gard. Chron.*

Culture.—The same authorities state that, "The proper season for the general shifting is when the young growth has hardened, and the blossom buds for next year can be detected at the extremity of the shoots.

"After shifting all those that require it, they may be placed in the open air, or retained in the green-house; as much air as possible should be admitted, and occasionally sprinkling the foliage will improve the appearance, as well as be beneficial to the health of the plants.

"At all times attention must be paid to watering them properly, the roots being apt to become matted in the pots, so as to render the ball of earth impervious to moisture; hence it is necessary to see that the ball of earth is moistened by the water poured upon it, instead of the web of fibres only. This renders an examination of the roots, or reducing and replanting them at least once a year, a measure almost indispensable.

"At the respective periods of growth and flowering, the plants will require plentiful watering; during the latter, if not regularly supplied, the bloom-buds will infallibly fall off, instead of expanding into flower; at other times a regular moderate supply is essential. The effect of constant watering may be presumed to diminish or destroy the fertility of the small quantity of earth allotted to each plant, therefore when the annual re-potting occurs, carefully take away as much of the former ball of earth as can be done without injuring or cutting the roots. The Camellia may be considered as a hardy green-house plant, requiring only a slight pro-

tection in severe weather, like the Myrtle; and if the plants are kept just above the freezing-point, they will succeed much better than when grown in a high temperature.

"At the time they are making their growth, an increase of heat will be advantageous."—*Gard. Chron.*

Grafting.—Dr. Lindley says, "For grafting, well-ripened young shoots should be taken when they are just beginning to grow, and before the buds are far advanced.

"They should be worked under hand-glasses in a stove or forcing-house, where a temperature of from 60° to 70° is kept up. Whip grafting without the tongue is perhaps the best method; and it is advisable to retain a few leaves on the stock above the graft, in order to draw on the sap. The single red makes the best stock, as it strikes freely from cuttings."—*Gard. Chron.*

Forcing.—Mr. Robert Errington, gardener at Charlton Park, has published a most excellent essay upon this subject, from which the following are extracts:—

"*Draining and Potting.*—In potting, place three or four potsherds first, the one overlapping the other, to insure a certain and speedy passage for the water, then a sprinkling of pounded crocks, the size of horse-beans; and finally another sprinkling, finer still; on this put a thin layer of sphagnum, which has been dried, but not decomposed.

"Re-pot soon after they have made their young growth—as soon, in fact, as the young leaves are perfectly developed, and the end of the young wood, at the point of junction with the wood of the former year, begins to turn a little brown. In potting, the soil should be rather lumpy than otherwise, and tolerably dry, and should be rather put round the ball in regular layers, and dressed tolerably firm, but not hard, as the layers are thrown in, pressing every layer a little, so that no crevice be left. The ball of the plant should be rather moist at shifting, and when it is in a pot-bound state it should be immersed in tepid water for an hour, about three days previous, allowing a day or two for the superfluous water to drain away before potting; place the ball immediately on the sphagnum.

"*Period of Growth.*—The thermometer should be kept from 60° to 65° by

day, and 50° to 55° by night. The treatment should now be of a close and moist character, giving air in moderation, and with caution, every morning from eight o'clock until noon, and then, unless very hot weather, shutting close up.

"There should be a little fire-heat every morning from seven o'clock until eleven, when it should be taken away until four o'clock, and then applied for the evening.

"The pipes, flues, and floors should be watered abundantly directly the air is taken away; then a good syringing at three o'clock; and the flues, &c., &c., wetted as before between five o'clock and six. Watering at the root must be carefully attended to when necessary, using weak liquid manure.

"*Period of Forming the Blossom-bud.*—Shading will now be indispensable, the best material for which is coarse canvas; those who are not too busy should remove it every afternoon at four o'clock, and replace it at nine on the following morning.

"The temperature should range from 65° to 70° by day, and from 55° to 60° by night, and be accompanied with a free circulation of air, avoiding all cutting winds.

"The plants must be very sparingly watered, in fact a good smart syringing every afternoon immediately the air is to be taken away, say four o'clock, will be nearly sufficient. The fire put out on a warm sunny day, about three o'clock; but it should be put entirely out about five o'clock, as it is only requisite to warm the pipes or flues sufficient to produce a genial vapour for the night; and half an hour after the fire is pulled out the whole of the flues, pipes and floors, should be saturated with water, to be evaporated by the next day's ventilation.

"*Period of Feeding the Bud.*—The fires may now be dispensed with entirely, merely observing, in the case of sunny afternoons, to make free use of sun heat, by shutting up the house early in the afternoon, say from three to four o'clock, according to the weather. Air should be given freely at all opportunities, and the plants should be syringed heavily at seven o'clock in the morning, and again at four o'clock in the afternoon, saturating the floors and flues, or pipes, with water in the evening.

"The plants may be well watered at the root whenever they require it.

"*Period of Blooming.*—Free watering, and the use of liquid manure as before recommended, must be persisted in, avoiding, however, excess. The plants require to be kept decidedly moist at the root while in the flowering state, rather more so, indeed, than at any other period; and if the potting and soil be right, and the drainage complete, little harm will ensue from a liberal use of water; still, any great extreme, either of drought or wet, will be fatal to the bud. Syringing must be entirely dispensed with, and in lieu thereof a deposit of dew should take place every afternoon at three or four o'clock.

"*Rest Period.*—The temperature at this period should be from 50° to 55° by day, and from 45° to 50° by night. Nothing is necessary in addition to a lower temperature, but syringing, steaming and regular watering, with a moderate circulation of air."—*Gard. Chron.*

An interesting work republished at Boston with notes and additions, entitled "*Monograph of the Camellia*," is worthy a place on the shelf of every admirer of this splendid plant.

CAMERARIA. Three species. Stove evergreen shrubs or trees. Cuttings. Loam and peat.

CAMOMILE or CHAMOMILE. (*Anthemis nobilis*.)

Varieties.—There are two varieties, the common single and the double flowering.

Soil and Situation.—They require a poor dry soil, otherwise they grow very luxuriant, and become not only less capable of withstanding severe winters, but also less powerful in their medicinal qualities. They will grow in any situation almost, but the more open the better.

Time and Mode of Propagation.—It is generally propagated by parting the roots and by offsets, which may be planted from the close of February until the end of May; the earlier, however, it is performed the better. This is the most favourable season, but it may be practised in the autumn. It is also raised from seed, the proper time of sowing which is in any of the early spring months, but as parting the roots gives much less trouble it is generally pursued, but after a lapse of several years raise fresh plants, the old ones

often declining in production after such lapse of time.

Cultivation.—They should not be planted nearer to each other than eighteen inches, as that also gives an opportunity to employ the hoe. Water must be given moderately at the time of planting, if dry weather. If raised from seed they require no further cultivation than to be kept free from weeds in the seed-bed; and when three or four inches high, to be thinned to about six inches apart, and may remain thus until the following spring, then to be thinned and remain, or to be removed to the above-mentioned distance apart. A very small bed will supply the largest family.

Gathering.—In July, the flowers are generally in perfection for gathering; the period for performing it, however, must be governed by the flowers themselves, as the best time is when they are just opened. Particular care must be taken to dry them thoroughly before they are stored, otherwise they will not keep. If seed be required, the only attention necessary is to leave some of the first opening flowers ungathered; the seed will ripen early in September, when it may be dried and rubbed out.

CAMPANULA. One hundred and thirty-nine species, and many varieties. Chiefly hardy herbaceous perennials; some green-house or hardy annuals, biennials, and evergreen shrubs.

Dr. Lindley, writing of their propagation, says:—"Either sow the seeds, or pot cuttings from the old roots, in leaf mould and sandy peat; as soon as they are strong enough, pot them off in sixty-sized pots regularly, shifting them into larger sizes as the plants require them; when they have gained a little strength, give them a rich loamy soil, well incorporated with a small proportion of bone dust, and at intervals supply them liberally with manure water."—*Gard. Chron.*

CAMPELIA *zanonia*. Stove herbaceous perennial. Seeds. Rich soil.

CAMPHOR TREE. *Cinnamomum camphora*.

CAMPION. *Cucubatus*.

CAMPYLANTHUS *salsoloides*. Green-house evergreen shrub. Cuttings. Sandy loam and peat.

CANADA ONION. See *Onion*.

CANARINA. Two species. Green-

house herbaceous perennials. Cuttings or division. Light loam and peat.

CANDLEBERRY MYRTLE. *Myrtica*.

CANDOLLEA. Four species. Green-house evergreen shrubs. Cuttings. Loam, peat and sand.

CANDY TUFT. *Iberis*.

CANELLA. Two species. Stove evergreen trees. Ripe leafy Cuttings. Loam, peat and sand.

CANKER. This disease is accompanied by different symptoms, according to the species of the tree which it infects. In some of those whose true sap contains a considerable quantity of free acid, as in the genus *Pyrus*, it is rarely accompanied by any discharge. To this dry form of the disease it would be well to confine the term canker, and to give it the scientific name of *gangræna sicca*. In other trees, whose sap is characterized by abounding in astringent or mucilaginous constituents, it is usually attended by a sanious discharge. In such instances it might strictly be designated ulcer, or *gangræna saniosa*. This disease has a considerable resemblance to the tendency to ossification, which appears in most aged animals, arising from their marked appetency to secrete the calcareous saline compounds that chiefly constitute their skeletons. The consequence is, an enlargement of the joints, and ossification of the circulatory vessels and other parts, phenomena very analogous to those attending the cankering of trees. As in animals, this tendency is generally throughout their system, but as is observed by Mr. Knight, "like the mortification in the limbs of elderly people, it may be determined as to its point of attack by the irritability of that part of the system."

This disease commences with an enlargement of the vessels of the bark of a branch or of the stem. This swelling invariably attends the disease when it attacks the apple tree. In the pear the enlargement is less, yet it is always present. In the elm and the oak sometimes no swelling occurs; and in the peach I do not recollect to have seen any. I have never observed the disease in the cherry-tree, nor in any of the pine tribe. The swelling is soon communicated to the wood, which if laid open to view on its first appearance by the removal of the bark, exhibits no marks of disease beyond the mere un-

natural enlargement. In the course of a few years, less in number in proportion to the advanced age of the tree, and the unfavourable circumstances under which it is vegetating, the swelling is greatly increased in size, and the alburnum has become extensively dead; the superincumbent bark cracks, rises in discoloured scales, and decays even more rapidly than the wood beneath. If the caries is upon a moderately-sized branch, the decay soon completely encircles it, extending through the whole alburnum and bark. The circulation of the sap being thus entirely prevented, all the parts above the disease of necessity perish. In the apple and the pear, the disease is accompanied by scarcely any discharge; but in the elm this is very abundant. The only chemists who have examined these morbid products, are Sir H. Davy and Vauquelin; the former's observations being confined to the fact, that he often found carbonate of lime on the edges of the canker in apple trees.

Vauquelin has examined the sanies discharged from the canker of an elm with much more precision. He found this liquor nearly as transparent as water, sometimes slightly coloured, at other times a blackish-brown, but always tasting acrid and saline. From this liquor a soft matter insoluble in water is deposited upon the sides of the ulcer. The bark over which the transparent sanies flows, attains the appearance of chalk, becoming white, friable, crystalline, alkaline, and effervescent with acids. A magnifier exhibits the crystals in the forms of rhomboids and four-sided prisms. When the liquid is dark-coloured, the bark appears blackish, and seems as if coated with varnish. It sometimes is discharged in such quantities as to hang from the bark like stalactites. The matter of which these are composed is alkaline soluble in water, and with acids effervesces. The analysis of this dark slimy matter shows it to be compounded of carbonate of potass and ulmin, a product peculiar to the elm. The white matter deposited round the canker was composed of

Vegetable matter	605
Carbonate of potass	342
Carbonate of lime	50
Carbonate of magnesia . . .	3

Vauquelin calculated from the quantity of this white matter that was found

about the canker of an elm, that 500 pounds weight of its wood must have been destroyed. There is no doubt that such a discharge is deeply injurious to the tree; but the above learned chemist appears to have largely erred, for he calculated from a knowledge of the amount of the saline constituents in the healthy sap, whereas in the diseased state these are much and unnaturally increased. I once was of opinion that the disease does not arise from a general diseased state of the tree, but that it is brought on by some bruise or injury, exasperated by an unhealthy sap consequent to an unfavourable soil, situation, and culture; but more extensive and more accurate examinations convince me, that the disease is in the tree's system; that its juices are vitiated, and that disease will continue to break out independent of any external injury so long as these juices continue peccant and unaltered. This conclusion will be justified, I think, by the preceding facts, as well as by those distributed through the following pages.

The disease is not strictly confined to any particular period of the tree's age. I have repeatedly noticed it in some of our lately introduced varieties that have not been grafted more than five or six years; and a writer in the *Gardener's Magazine*, vol. v., p. 3, states, that the trees in his orchard, though "only of four years' growth, are sadly troubled with the canker." Although young trees are liable to this disease, yet their old age is the period of existence most obnoxious to its attacks. It must be remembered that that is not consequently a young tree which is lately grafted. If the tree from which the scion was taken be an old variety, it is only the multiplication of an aged individual. The scion may for a few years exhibit signs of increased vigour, owing to the extra stimulus of the more abundant supply of healthy sap supplied by the stock; but the vessels of the scion will, after the lapse of that period, gradually become as decrepid as the parent tree. The unanimous experience of naturalists agrees in testifying that every organized creature has its limit of existence. In plants it varies from the scanty period of a few months to the long expanse of as many centuries; but of all the days are numbered;

and although the gardener's, like the physician's skill, may retard the onward pace of death, he will not be permanently delayed. In the last periods of life they show every symptom that accompanies organization in its old age, not only a cessation of growth, but a decay of former development, a languid circulation and diseased organs.

The canker, as already observed, attends especially the old age of some fruit trees, and of these the apple is most remarkably a sufferer. "I do not mean," says Mr. Knight, "to assert that there ever was a time when an apple-tree did not canker on unfavourable soils, or that highly cultivated varieties were not more subject to the disease than others, where the soil did not suit them. But I assert from my own experience and observation within the last twenty years, that this disease becomes progressively more fatal to each variety, as the age of that variety beyond a certain period increases; that if an old worn-out orchard be planted with fruit trees, the varieties of the apple, which I have found in the catalogues of the middle of the seventeenth century, are unproductive of fruit, and in a state of debility and decay."

Among the individuals particularly liable to be infected, are those which have been marked by an excessively vigorous growth in their early years. I had one in my garden at Great Totham, which for the first twelve years of its existence was remarkable for the unnaturally large size and abundance of its annual shoots. It then became grievously affected by canker, which at length destroyed it.

Trees injudiciously pruned or growing upon an ungenial soil, are more frequently attacked than those advancing under contrary circumstances. The oldest trees are always the first attacked of those similarly cultivated. The golden pippin, the oldest existing variety of the apple, is more frequently and more seriously attacked than any other. The soil has a very considerable influence in inducing the disease. If the subsoil be a ferruginous gravel, or if it is not well drained, and the soil be aluminous, and effective means are not adopted to free it of superabundant moisture, the canker, under any one of these circumstances, is almost certain to make its appearance amongst the trees

they sustain, however young and vigorous they were when first planted.

How inductive of this disease is a wet retentive subsoil, if the roots penetrate it, appears from the statement of Mr. Watts, gardener to R. G. Russell, Esq., of Chequers Court, in Buckinghamshire. — A border beneath a south wall had a soil three feet and a half in depth, apparently of the most fertile staple, twice re-made under the direction of the late Mr. Lee, of the Vineyard, Hammer-smith. In this the trees, peaches and nectarines, flourish for the next three or four years after they are planted, but are then rapidly destroyed by the canker and gum. The subsoil is a stiff sour clay, nearly approaching to a brick earth; and the disease occurs as soon as it is reached by the roots of the tree. But this is certainly not a conclusion warranted by the premises, because the acidity of the sap, whatever may be its source, would be likely to injure and corrode, in the first instance, those parts where the vessels are most weak and tender; now these, past dispute, are in the branches. Moreover, we generally see the youngest branches the earliest sufferers.

Pruning has a powerful influence in preventing the occurrence of the canker. I remember a standard russet apple-tree of not more than twenty years' growth, with a redundancy of ill-arranged branches, that was excessively attacked by this disease. I had two of its three main branches, and the laterals of that remaining, carefully thinned; all the infected parts being at the same time removed. The result was a total cure. The branches were annually regulated, and for six years the disease never re-appeared. At the end of that time the tree had to be removed, as the ground it stood upon was required for another purpose. John Williams, Esq., of Pitmaston, from long experience concludes, that the golden pippin and other apples may be preserved from this disease, by pruning away every year that part of each shoot which is not perfectly ripened. By pursuing this method for six years, he brought a dwarf golden pippin tree to be as vigorous and as free from canker as any new variety.

All these facts unite in assuring us that the canker arises from the tree's weakness, from a deficiency in its vital

energy, and consequent inability to imbibe and elaborate the nourishment necessary to sustain its frame in vigour, and much less to supply the healthy development of new parts. It matters not whether its energy be broken down by an unnatural rapidity of growth, by a disproportioned excess of branches over the mass of roots, by old age, or by the disorganization of the roots in an ungenial soil; they render the tree incapable of extracting sufficient nourishment from the soil, consequently incapable of developing a sufficient foliage; and therefore unable to digest and elaborate even the scanty sap that is supplied to them. The reason of the sap becoming unnaturally saline, appears to be, that in proportion as the vigour of any vegetable declines, it loses the power of selecting by its roots the nourishment congenial to its nature. An ungenial soil would have a debilitating influence upon the roots, in a proportionate though less violent degree than a corrosive poison; and as these consequently would absorb soluble bodies more freely, and without that discrimination so absolutely necessary for a healthy vegetation, so the other most essential organs of nutrition, the leaves of the weakened plants, would promote and accelerate the disease. These, reduced in number and size, do not properly elaborate the sap; and I have always found that under such circumstances these stunted organs exhale the aqueous particles of the sap very abundantly, whilst their power of absorption is greatly reduced. The sap thus deficient in quantity and increased in acidity seems to corrode and affect the vascular system of the tree in the manner already described. These facts afford us most important guides in attaining the desired objects, the prevention and cure of the disease. If super-luxuriance threaten its introduction, the best remedy is for the cultivator to remove one of the main roots of the tree, and to be particularly careful not to add any fertile addition to the soil within their range. On the contrary, it will be well, if the continued exuberant growth shows the necessity, for the staple of the soil to be reduced in fertility, by the admixture of one less fertile, or even of drift sand. If there be an excess of branches, the saw and the pruning knife must be gradually

applied. It must be only a tree of very weak vital powers, such as is the golden pippin, that will bear the general cutting of the annual shoots as pursued by Mr. Williams; a new vigorous variety would exhaust itself the following year in the production of fresh wood. Nothing beyond a general rule for the pruning can be laid down, and it amounts to no more than the direction to keep a considerable vacancy between every branch, both above and beneath it, and especially to provide that not even two twigs shall chafe against each other. The greater the intensity of light, and the freer the circulation of air amongst the foliage of the tree, the better the chance for its healthy vegetation. If the disease being in a fruit tree be a consequence of old age, it is probably a premature senility induced by injudicious management, for very few of our varieties are of an age that insure to them decrepitude. I have never yet known a tree, unless it was in the last stage of decay, that could not be recovered by giving it more air and light, by careful heading in pruning, improvement of the soil, and cleansing the bark.

If the soil by its ungenial character induces the disease, the obvious and only remedy is its amelioration; and if the subsoil is the cause of the mischief, the roots must be prevented striking into it. In all cases it is the best practice to remove the tap root. Many orchardists pave beneath each tree with tiles and broken bricks. If the trees are planted shallow, as they ought to be, and the surface kept duly fertile, there is not much danger of the roots striking into the worse pasturage of the subsoil. On this point the experience of Mr. W. Nichol, the gardener at Newick-place in Sussex, agrees with my own. He says, that the canker may be avoided in most instances, by paying proper attention to the soil in which the tree is planted. Canker, he thinks, will seldom occur if the surface soil is good, for in that case the roots will never descend into the prejudicial subsoil, but spread out their radicles near the surface, where they find food most abundant. If this is not kept up, the roots descend into the obnoxious substratum, and the disease assuredly follows.

It remains for me to detail the course

of treatment that I have always found successful in effecting a cure in any variety, not decrepid from age, if the canker has not spread to the roots.

Having completely headed down, if the canker is generally prevalent, or duly thinned the branches, entirely removed every small one that is in the least degree diseased, and cut away the decayed parts of the larger, so as not to leave a single speck of the decayed wood, I cover over the surface of each wound with a mixture while in a melted state, of equal parts tar and rosin, applying it with a brush immediately after the amputation has been performed, taking care to select a dry day. I prefer this to any composition with a basis of cow-dung and clay, because the latter is always more or less absorbent of moisture, and is liable to injury by rain and frost, causing alternations of moisture and dryness to the wounds, that promote decay rather than their healing, by the formation of new wood and bark. The resinous plaster seldom or never requires renewal. Mr. Forsyth, the arch-advocate of earthy and alkaline plasters, finding that they promoted decay, if applied to the wounds of autumn-pruned trees, recommends this important act of cultivation to be postponed to the spring. Such a procrastination is always liable to defer the pruning until bleeding is the consequence. If a resinous plaster be employed, it excludes the wet, and obviates the objection to autumnal pruning. Mr. Forsyth's treatment of the trunks and branches of trees, namely, scraping from them all the scaly dry exuvia of the bark, is to be adopted in every instance. He recommends them to be brushed over with a thin liquid compound of fresh cow-dung, soap-suds, and urine, but I very much prefer a brine of common salt; each acts as a gentle stimulus, which is their chief cause of benefit, and the latter is more efficacious, destroying insects, and does not, like the other, obstruct the perspiratory vessels of the tree. The brine is advantageously rubbed in with a scrubbing or large painter's brush. Some persons recommend a liquid wash, containing, as prominent ingredients, quick-lime and wood-ashes, which, as the disease arises from an over-alkalescent state of the sap, cannot but prove injurious, and aggravate

the disease. Mr. Forsyth, formerly gardener at Kensington Palace, made a considerable sensation at the close of the last and at the commencement of the present century, by the wonderful effects produced upon trees, as he asserted, by the following composition, used as a plaster over the wounds from which the decayed or cankered parts had been cut out:—One bushel of fresh cow-dung; half a bushel of lime rubbish, that from ceilings of rooms is preferable, or powdered chalk; half a bushel of wood-ashes; one-sixteenth of a bushel of sand; the three last to be sifted fine. The whole to be mixed and beaten together until they form a fine plaster.

Mr. Forsyth received a parliamentary grant of money for his discovery; but this, as Mr. Knight observes, "affords a much better proof that he was paid for an important discovery, than that he made one."

It has been very ingeniously suggested, that if a destruction of the bark by external violence, and consequently likely to terminate in canker, has occurred, it would be a good plan to insert, as in budding, a piece of living bark, exactly corresponding to the excision, from a less valuable tree.

In conclusion, I would enforce upon the orchardist's attention the importance of obtaining his grafts or buds from trees not affected by the disease, because apparently it is hereditary; and, although after-culture may eradicate the malady, it is always far better to avoid the infection, than to have to employ a specific. Having noticed the gangrene as it appears in various forms upon our trees, we may now turn to a few of the many instances where it occurs to our fruits and flowers, for it is not too much to say that scarcely a cultivated plant is within our enclosures that is not liable to its inroads. It assumes different aspects, and varies as to the organs it assails; yet still in some mode, and in some of their parts, all occasionally suffer, for it is the most common form of vegetable disease.

The canker in the *auricula* is of this nature, being a rapidly-spreading ulcer, which, destroying the whole texture of the plant where it occurs, prevents the rise of the sap. Some gardeners believe it to be infectious, and therefore destroy the specimen in which it occurs,

unless it be very valuable; but this I believe to be an erroneous opinion, the reason of its appearing to be infectious or epidemic being, that it occurs to many when they are subjected to the same injurious treatment which gives birth to the disease.

It appears to be caused by the application of too much water, especially if combined with superabundant nourishment. Therefore, although cutting out the decaying part, when it first appears, and applying to the wound some finely-powdered charcoal, will effect a cure if the disease has not penetrated too deeply, yet it will be liable to return immediately if a less forcing mode of culture be not adopted. No auricula will suffer from this disease if it be shifted annually, and the tap root at the time of moving be shortened; a thorough system of draining being adopted, either by using one of the pots suggested in another part of this work, or by having the pot used one-fourth filled with pebbles, and excessive damp during the winter being prevented by proper shelter.

Parsley grown in a poor soil is also liable to canker in the winter. Mr. Barnes says, he never found any application which eradicated this disease so effectually as a mixture in equal parts of soot and slaked lime, sown over the plants. The cure is complete in a few days, the vigour of the plants restored indicating, that this species of ulceration, like that which is found in the dwellings of the poor, arises from deficient nourishment.

The tubers of the *potato* also are liable to the speck, black spot, or dry gangrene, a disease which I once thought was occasioned by the calcareous earth, lime, or chalk contained by the soil, but more lengthened observation has convinced me of my error; and having observed it in all soils, and in seasons characterized by opposite extremes of wetness and dryness, I am induced to consider that the disease arises from some defect in the sets employed, or to potatoes being grown too often on the same site. It is quite certain, from my own experience, that in ground tired of potatoes, the disease invariably, and most extensively, appears. This suggests that it is occasioned by a deficiency of some constituent in the soil, a suggestion confirmed by the fact, that in the fields of

the market gardeners near London, which are supplied without stint with the most fertilizing manure, this disease of the potato is comparatively unknown.

The stems of succulent plants, such as the cacti *mesembryanthemums*, and the balsam, as well as the fruit of the cucumber and melon, and the stalk of the grape, are all liable to moist gangrene, all requiring for the development of the disease excessive moisture in the air, though the immediate cause of its outbreak is usually a sudden reduction of temperature.—*Principles of Gardening*.

CANNA. Thirty-eight species and some varieties. Stove herbaceous perennials. Seed or division. Rich light soil.

C. iridiflora is the most splendid; a writer in the *Gardener's Chronicle* says, that "so far from requiring stove heat, few plants cultivated in a green-house are more hardy. It only requires protection from frost, and the border of the conservatory is its proper place, where it continues growing, with the thermometer varying between 35° and 45°."

CANTERBURY BELL. *Campanula medium*.

CANTHIUM dubium. Green-house evergreen shrub. Cuttings. Rich soil.

CAPE JASMINE. *Gardenia florida*.

CAPE PHILLYREA. *Cassine capensis*.

CAPER TREE. *Capparis*.

CAPPARIS. Capers. Twenty-nine species. Chiefly stove evergreen shrubs. Cuttings. Loam and peat.

CAPRIFOLIUM. Goat Leaf. Seventeen species and some varieties. Chiefly hardy deciduous, or evergreen twining or climbing plants. Cuttings. Common soil.

CAPSICUM. Twenty-four species and some varieties. Stove evergreen shrubs, or hardy and stove annuals. Seeds. Rich open soil.

The following are the kitchen garden species and varieties.

Capsicum Annuum.—*Capsicum* or Guinea Pepper. Of this there are five varieties:—

1. Long-podded.
 2. Heart-shaped.
 3. Short-podded.
 4. Angular-podded.
 5. Round Short-podded.
- C. Cerasiforme*.—*Capsicum* or Cherry

Pepper. Of this there are three varieties:

1. Cherry-shaped.
2. Bell-shaped, or Ox-heart.
3. Yellow-podded.

C. grossum.—Capsicum, or Bell Pepper. Of this there are three varieties:—

1. Old Bell-shaped or Bull-nose.
2. Sweet or Spanish.
3. Tomato-shaped.

Soil and Situation.—The soil best suited for them is a rich moist loam, rather inclining to lightness than tenacity.

Time and Mode of Sowing.—They are propagated by seed, which may be sown towards the end of March or beginning of April in a hot-bed of moderate size, with the shelter of a frame; or somewhat later on an open border, protected from cold winds: when the plants are sufficiently advanced they may be transplanted to their permanent position in the garden.

To obtain Seed.—For the production of seed a plant bearing some of the forwardest and finest fruit of each variety must be preserved, that it may be ripe before the frosts commence, the first of which usually kills the plants. When completely ripe, the pods are cut and hung up in the sun, or in a warm room, until completely dry, in which state they are kept until the seed is wanted for sowing.

CARAGANA. Fourteen species. Chiefly hardy deciduous shrubs. Grafts, layers or seeds. Sandy open loam.

CARALLIA lucida. Stove evergreen tree. Cuttings. Sandy peat and loam.

CARALLUMA. Four species. Stove evergreen shrubs. Cuttings. Loam and brick rubbish.

CARAPA. Four species. Stove evergreen trees. Cuttings. Loam and sandy peat.

CARAWAY. *Carum Carui*.

CARDAMINE. Lady's Smock. Eleven species. Hardy herbaceous plants. Division. Peat and loam.

CARDINAL FLOWER. *Lobelia cardinalis*.

CARDOON. (*Cynara cardunculus*.)

The stalks of the inner leaves, when rendered tender by blanching, are used in stews, soups, and salads.

Soil and Situation.—A light rich soil is most suitable to this vegetable, dug deep and well pulverised. The situation must be open, and free from trees.

Time and Mode of Sowing.—It may be sown at the close of March, but for the main crop not until the early part of April, those plants raised from earlier sowings being apt to run at the close of autumn; for a late crop, a sowing may be performed in June. The best practice is to sow in patches of three or four rows four feet apart each way, to be thinned finally to one in each place, the weakest being removed. If, however, they are raised in a seed bed, they will be ready for transplanting in about eight or ten weeks from the time of sowing, and must be set at similar distances as are specified above.

The plants of the first sowing are generally three weeks before they make their appearance; those from the latter ones about two. If after a lapse of these times they do not appear, it should be ascertained if the seed is decayed, and in that case the sowing renewed. The seed must be sown rather thin, and covered about half an inch. When about a month old, the seedlings, when too thick, must be thinned to four inches apart, and those removed may be pricked out at a similar distance. When of the age sufficient for their removal they must be taken up carefully, and the long straggling leaves removed. The bed for their reception must be dug well and laid out in trenches as for celery, or a hollow sunk for each plant; but as they are liable to suffer from excessive wet, the best mode is to plant on the surface, and form the necessary earthing in the form of a tumulus. Water must be applied abundantly at the time of planting, as well as subsequently, until they are established; and also in August, if dry weather occurs, regularly every other night, as this is found to prevent their running to seed. The only other necessary point to be attended to is, that they may be kept free from weeds during every stage of their growth. When advanced to about eighteen inches in height, which according to the time of sowing will be in August, and thence to October, the leaves must be closed together by encircling them with a hay-band, and earth placed round each plant, a dry day being selected for performing it. As they continue to grow, fresh bands and earth must be constantly applied until they are blanched to the height of two feet, or about two-

thirds of their stems. They will be fit for use in eight or ten weeks after the earthing first commences. Care must be had in earthing them up, to prevent the earth falling in between the leaves, which is liable to induce decay. The surface of the soil should likewise be beaten smooth to throw off the rain. In severe weather their tops should be covered with litter, by which they may be preserved in a serviceable state throughout the winter.

To obtain Seed—Which in this country seldom comes to maturity, but in dry seasons a few plants should be set in a sheltered situation of the April sowing, not earthed up, but allowed the shelter of mats or litter in frosty weather. The flowers make their appearance about the beginning of July, and the seed is ripe in September.

CARDUNCULUS. Two species. Hardy herbaceous perennials. Division. Common soil.

CARDUUS. Thirty-eight species. Hardy annuals, biennials, and perennials. Seeds or division. Common soil.

CAREYA. Three species. Stove evergreens; *C. herbacea* is a splendid herbaceous stove plant. Division. Light loam and sandy peat.

CARGILLIA. Two species. Greenhouse evergreen trees. Cuttings. Peat and open loam.

CARICA. Six species. Chiefly stove evergreen trees. Leafy cuttings. Loamy soil.

CARISSA. Five species. Stove evergreen trees. Cuttings. Peat and loam.

CARLINA. Ten species. Hardy plants; *C. lyrata* is a greenhouse biennial. Seeds. Common soil.

CARLOWIZIA salicifolia. Greenhouse evergreen shrub. Cuttings. Sandy loam.

CARLUDOVICA. Five species. Stove evergreen climbers, or herbaceous perennials. Suckers. Sandy peat and loam.

CARMICHAELIA australis. Greenhouse evergreen shrub. Cuttings. Sandy peat.

CARNATION. *Dianthus caryophyllus.* The Carnation is a prominent flower at the horticultural shows in England, and exciting contests for the premiums are annually exhibited. In the United States it succeeds but indifferently well, and a really good col-

lection of Carnations is a rarity: indeed so rare, that but few of us have seen what a British amateur would deem worth looking at. We reprint the whole of the article on the subject as it originally stood in the Dictionary, for the benefit of those who may be disposed to make importations and embark in the culture of this charming flower.

Mr. J. F. Wood, of the Coppice, Nottingham, gives the following list of varieties.

Scarlet Bizarres.—Twitchett's Don John; Martin's Splendid; Headley's Achilles; Headley's William Cobbett; Bucknall's Earl Fitzharding; Strong's Duke of York; Wilmer's Conquering Hero.

Crimson Bizarres.—Puxley's Prince Albert; Holmes' Count Paulina; Mausley's Robert Burns; Ely's Lord Milton; Jacques' Georgiana; Chambers' Kate; Jacques' Iris; Parker's Sophia.

Scarlet Flakes.—Twitchett's Queen of Scarlet; Wigg's Earl of Leicester; Bucknall's Ulysses; Wilson's William the Fourth; Wilmer's Hero of Middlesex; Addenbrook's Lydia.

Purple Flakes.—Mausley's Beauty of Woodhouse; Headley's Empress of Purples; Headley's Incognita; Pollard's First-rate; Wilmer's Solander; Millwood's Premier; Strong's Esther.

Rose Flakes.—Brooks' Flora Garland; Greasley's Village Maid; Wilson's Harriet; Ely's Lady Ely; Siclamore's Lady Rowley; Pearson's Madam Mara.

Scarlet Bizarres.—Jolly Dragoon (Ely's); Game Boy (Rainforth's); Leader (Hepworth's); Don John (Merchant's); Lady of the Manor (Millwood's); Patriarch (Hulton's); Union Jack (Ward's); Sir Robert Peel (Groves'); Locomotive (Morris'); Duke of Leeds (Hoyle's); Prince Albert (Hoyle's); Splendid (Martin's); Conquering Hero (Wilmer's); Brutus (Colcut's); Juba (Colcut's); Charles the Twelfth (Mausley's); William the Fourth (Walmsley's); Colonel (Lee's) Duke of Devonshire; Mars (Walmsley's).

Crimson Bizarres.—Duke of Bedford (Ely's); Count Paulini (Holmes'); Duchess of Kent (Brown's); Bloomsbury (Soorn's); Hector (Brown's); Lord Milton (Ely's); Lord Brougham (Greasley's); Squire Plumtree (Hulton's);

Mrs. Brand (Ely's); William Caxton (Ely's); Robert Burns (Mausley's); Tally-ho (Woolley's); Bonpland (Wilmer's); Dord Durham (Tomlinson's); Rainbow (Cartwright's); Squire Ray (Hufton's); Betty (Lovegrove's); King Alfred (Gregory's); Eclipse (Eason's); Taglioni (Pickering's).

Scarlet Flakes.—Beauty of Cradley (Wallis'); Ringleader (Toane's); Bright Venus (Ely's); Premier (Creswell's); Lord Morpeth (Ely's); Captain Ross (Ely's); Mary Anne (Greasley's).

Rose Picotees.—Few of this class are grown near Nottingham; the following are amongst the best: Queen Victoria (Green's); Favourite (Giddens'); Fanny Irby (Wilson's); Marchioness of Westminster (Evans'); Queen Victoria (Wains'); Ann Page (Lovegrove's); Marquis of Granby (Simpson's); Earl of Errol (Wilmer's); Wellington (Foster's); Earl of Leicester (Wigg's); Rob Roy (Orson's); Madame Mara (Pearson's); William the Fourth (Wilson's); Lady Hill (Pugh's); Fox Hunter (Hufton's); Donna Maria (Millwood's); Red Rover (Fletcher's); Bishop of Gloucester (Brown's).

Rose Flakes.—Lovely Anne (Ely's); Rosea (Hulton's); Queen Victoria (Hyron's); Lady Gardiner (Ely's); Lady Ely (Ely's); Elizabeth (Easum's); Village Maid (Greasley's); Lady Flora (Hudson's); Sarah (Hastings'); Brewing (Hoyle's); Miss Walker (Ashworth's); Mrs. Pickering (Pickering's); Lovely Nancy (Hoyle's); Eliza (Parkinson's); Emma (Lakin's); Miss Molly (Ely's); Queen of England (Fletcher's); Luna (Brown's); Lady Egerton (Low's); Lady Grey (Malpas').

Purple Flakes.—Mango (Ely's); Beauty of Woodhouse (Mausley's); Bellero-phon (Leighton's); Prince Charlotte (Turner's); Premier (Millwood's); Squire Meynell (Brabbin's); Sir J. Plastain (Bates'); British Queen (Elliot's); Invincible (Simpson's); Major (Spray's); Miss Thornton (Hudson's); Enchanter (Pearson's); Rev. J. Gisborne (Brabbin's); Magnificent (Ely's); Queen Victoria (Ely's); Cleopatra (Weldon's); First Rate (Pollard's); Platoff (Hall's); Major Cartwright (Hall's).

Red Picotees.—Mrs. Flower (Ely's); Miss Bacon (Wollard's); Little Wonder (Wollard's); Duke of Wellington (Sharp's); Mary (Morris'); Pilot (Mor-

ris'); Will Stakely (Hutton's); Derby Willow (Maw's); King of the French (Green's); Royal Briton (Hardy's); Matilda (Parkinson's); Venus (Hudson's); Mary Antony (Benn's); Hector (Sharp's); Cornelius (Barraud's); Colonel Foreman (Barraud's); Teazer (Giddens'); Cæsar (Giddens'); Criterion (Sharp's); Catherine (Hardy's); Nulli Secundus (Mausley's); Bloomsbury (Clegg's); Mrs. Judson (Wheatley's); Lady Peel (Pullen's); Vespasian (Giddens'); Victoria (Muscroft's); Queen of Sheba (Wakefield's); Nottingham Hero (Robinson's); Mr. Mugglestone (Robinson's); Hope (Brinkler's); Trip to Cambridge (Dickson's); Grace Darling (Ely's); Pluperfect (Wilson's); Queen Victoria (Kirkland's); Nehemiah (Hufton's); Delight (Jackson's); Victoria (Crask's); Isabella (Hufton's); Miss Hunter (Hufton's), alias Toones, Miss Garey; Mary (Lee's).

Characteristics of Excellence.—Mr. Orson, at a meeting of the Floricultural Society, made these excellent observations:—"Carnations were originally divided into three classes, viz., *Bizarres*, *Flakes*, and *Picotees*; but the latter are now considered a distinct variety. *Bizarres* were distinguished by having two colours, and flakes by having only one colour upon a white ground; these two principal classes being subdivided into scarlet, crimson, pink, and purple *bizarres*—scarlet, purple, and pink or rose flakes. In some counties pink, purple, and crimson *bizarres* were all classed under the head of pink *bizarres*, whereas in other parts of the country they were known as crimson *bizarres*.

"The calyx, or pod, should be long, firm, and entire, of sufficient substance to support the petals, which should be thick, broad, and substantial, smooth, and free from indenture on the edge. The guard petals should rise gracefully above the pod, and turn in a horizontal direction, having a gradual disposition to cup, but not terminating in an abrupt curl, at the outer edge, the whole forming a complete circle. The interior petals should rather decrease in size as they approach the centre, each row being regularly and alternately arranged above the other, and not have a loose and gaping appearance, in fact, the spaces should be only sufficient to display the colouring distinctly. The number of petals in a first rate flower should not be less than seventeen, three

of them being placed in the centre, to form a crown.

"The whole would then, if well arranged, produce the form of the half of an oval or elliptic, when held on a side view; having, when seen from above, a circular appearance. The colours, whether bizarre or flake, should be strong, brilliant, and distinct throughout. The ground colour should be a pure white; free from speck, spot, tint, or tinge of any sort. The flakes should be broad and bold, commencing at the extreme edge, of a proportionate width to the petal, running through to the centre, or as far as the eye can discern, and diminishing in breadth as they approach the centre, in the same ratio as the petal. The distribution of colours should be equal in every respect: in a flake, not less than three divisions in each petal; in a bizarre, not less than five divisions, and properly arranged; their respective and united beauties should be strikingly apparent.

"Size should not be lost sight of, though it should never take precedence, unless the other general properties were equal. The disqualifications of a carnation are—a dead, loose, mutilated, or split petal, a petal having no white on the upper side; a petal having (if a flake) no colour upon the white on the upper side; a petal upon which (if a bizarre) there are not two colours upon the white on the upper side; if the pod be split down to the sub-calyx, or cut away in any part."—*Gard. Chron.*

"The properties of the picotee, with regard to form and petal," says the same authority, "are the same as in the carnation, with this exception, that, as the colour of the picotee is, or ought to be, confined to the margin of the petal, a greater degree of fulness was admissible, proportionate with the lightness or narrowness of the marking. The colour should be clear and distinct, confined to the edge of the petal, and not running down or barring; neither should the white in the slightest degree run through to the edge of the petals, but whether lightly or heavily marked, the colour should be regular, at an equal distance from the edge all round the petal, each petal having the same regularity of colouring throughout the flower.

"Although a full flower is not so objectionable as in the carnation, yet, as

very full picotees are not to be advocated, a medium fulness is best. The same disqualifications with regard to the petal and pod are applicable as to the carnation."—*Gard. Chron.*

Soil.—Dr. Horner recommends—"Two parts old pasture sods, two years old, and one part old frame manure, three years old, with a sufficient addition of coarse river sand, to prevent tenacity of the soil. Pasture sods reduced to mould, are preferable to soil taken from a greater depth, inasmuch as they contain the fibrous roots of the grass, which during their gradual decay afford a constant supply of most acceptable nourishment."—*Gard. Chron.*

"*Propagation.*—Pipings stuck in this mould are to be covered with a hand-light, exposed fully to the sun; but in hot weather, in the evening, water poured over the hand-light; pick out worms and slugs. If the pipings are placed in a box, covered first with a bell-glass, which is to be exchanged for a small hand-glass, or a larger bell-glass, as the pipings begin to grow, the boxes placed on a stage on the north side of a tree, and the stage resting on feeders, filled with lime-water, there is less trouble with insects, and the pipings will grow very well, but not so rapidly."—*Gard. Chron.* For the best mode of obtaining pipings, see *Pink*.

Raising Varieties.—Dr. Lindley says,—"The fertilization of carnations should be performed as soon as the stigmas unfold. The action of pollen is not instantaneous, but slow; and it is necessary that it should adhere.

"Although it may produce no effect at the time of applying it, yet it will eventually fertilize the seed-vessel, if the flower be kept dry. If the seed-vessel grows, and yet the seed does not swell, it is because fertilization has not taken place. It would increase the probability of procuring seed, to place the pots near a south wall. It is of no use to cut out the centre petals when the flower is very double."—*Gard. Chron.*

Sowing.—"The surface of the soil should be finely pulverized, and the bed raised somewhat above the level of the adjoining ground. The seed may be scattered broadcast over the bed, and afterwards lightly pressed with the back of a rake."—*Gard. Chron.*

"Seedlings are always more vigorous

than those that have been in cultivation for a length of time.

"It is not usual for carnations and pinks to bloom the first season. When the seed is sown early, flower-stems are occasionally thrown up late in the autumn, and all destroyed by frost."—*Gard. Chron.*

The plants generally come up in a month after sowing; give occasional watering and weeding, and in July they will be fit to prick out into nursery beds, which prepare in an open situation, three feet wide; and taking advantage of moist weather, prick the plants therein four inches apart, and finish with a general watering, which repeat occasionally till all the plants have taken good root. Here let them remain till September,—when they will be so well advanced in growth as to require more room; and should have their final transplantation into other three-feet-wide beds of good earth, in rows lengthways the bed, nine inches asunder, and the same distance in the lines, placing them in the quincunx order; and here they are to remain all the winter, and until they flower, and have been increased by layers; until which periods all the culture they require is, that if the winter prove very severe, an occasional shelter of mats, during the hardest frost, will be of much advantage, and in spring, loosen the ground between them with a hoe. Keep them always clear from weeds, and when their flower-stalks advance, tie them up to sticks. They will flower in June, July, and August, at which times, as soon as the singles and doubles are distinguishable, all the singles may be rejected.

When fully blown, examine their properties; the finest may be marked for stage flowers, and the others are furniture for the borders; all of which may be increased by layers the same year.

Propagation by Layers.—The proper parts for layers are those leafy shoots arising near the crown of the root, which, when about five inches long, are of a proper degree of growth.

The general season for this work is June, July, and beginning of August, and the sooner it is done after the shoots are ready the better, that they may have sufficient time to acquire strength before winter. Those layered in June and July will be fit to take off in August and September.

The method of performing the work is as follows:—First provide a quantity of small hooked sticks, three or four inches long, with which to peg the layers down, also in a barrow a quantity of light rich mould to raise the earth, if required, around each plant; and provide also a sharp penknife. Having all these ready, then proceed to the work of layering: first, strip off all the leaves from the body of the shoots, and shorten those at the top an inch or two evenly; and then, fixing upon a strong joint about the middle of the shoot, and on its under side, cut the joint half way through, directing your knife upward, so as to slit the shoot up the middle almost to the next joint above; of which joint the thin skinny part must be trimmed off, for the layers always form their root at that part. This done, loosen the earth around the plant, and, if necessary, add some fresh mould to raise it for the more ready reception of the layers; then with your finger make a hollow or drill in the earth to receive the layer, which bend gently down horizontally in the opening, raising the top upright, so as to keep the gash, or slit part of the layer, open, and with one of the hooked sticks peg down the body of the layer to secure it in its proper place and position, still preserving the top erect and the slit open, and draw the earth over it an inch or two, bringing it close about the erect part of the shoot; and when all the shoots of each plant are thus layered, give some water to settle the earth close, repeating the waterings often in dry weather; and in five or six weeks the layers will have formed good roots, when they should be separated with a knife from the old plants, and planted in beds or pots.

Taking off and transplanting the Layers.—The layers are generally well rooted in six weeks after layering, which you will observe by opening the earth a little, and examining the bottom, or root part; and if it has emitted plenty of fibres, they should be taken off, and planted out.

They must be cut, or separated with a knife from the old plant, gently raising them out of the earth with the point of a trowel, to preserve the fibres, or roots of the layers; and when thus taken up, cut off the naked sticky part at bottom close to the root, and trim the tops

of the leaves a little: they are then ready for planting, either into beds or pots, but rather into nursery-beds of good earth, to remain six weeks, and then the fine sorts may be potted. Therefore, choosing a bed or border of rich light earth, let it be then neatly dug, and the surface raked smooth, and here plant the layers, with a dibble, at six or eight inches distance; give directly a good watering, and repeat it, in dry weather, every day or two, for a week or a fortnight, when the plants will have taken fresh root, and begin to advance.

In this bed let them take their growth till October, then the fine varieties may be potted in small pots (forty-eights) for moving to occasional shelter from hard frosts, till spring, then into large pots, to remain to flower; therefore, at the above-mentioned time in autumn, take up the layers of the prime sorts from the nursery beds into small pots, and give a moderate watering, and place them in a warm situation, in the full air, till November, then move them to occasional shelter, as directed in their winter culture.

The more common sorts may either at the above time in autumn be transplanted into the borders or other compartments of the pleasure ground, where they are to remain to flower, or may be continued in the beds until spring; and then a due quantity may be disposed in the borders, or retained in the same bed, for flowering.

Winter Culture.—In November, the varieties in pots should be moved to a sunny, sheltered situation for the winter; and if placed in a frame, &c., to have occasional protection from hard frost, it will be of much advantage. The pots may be placed close together, or if the bed is raised three, four, or six inches, with a light dry earth, sand, or ashes, and so plunge the pots in it to their rims, it will be a greater protection for their roots, covering them occasionally with the glasses in hard frosts, &c.; but for want of frames, a bed prepared as above may be arched over with hoops, to be covered occasionally with mats.

Under either of those shelters the plants are to be covered with glasses or mats only in time of severe frost, but must enjoy the full air in all open weather, by having all covering en-

tirely off, for if much covered it would draw them up weak and tender.

Be careful also that the drainage in the pots is very good.

Thus continue your care of the potted plants till spring, and then shift them into large pots, to remain to blow, as directed in their spring culture.

In respect to those in the open beds, although they commonly stand the winter tolerably, yet, if you have any spare frames, or the beds arched over, to be covered with mats or long dry litter in severe frosts, it will be of much advantage.

Spring Culture, Shifting, &c.—In the latter end of February, or some time in March, the layers in the small pots, or such as are in beds, and that you intend shall blow in pots, should be transplanted with balls into the large pots, where they are to remain.

The pots proper for their reception for flowering, should be nine or ten inches at least in the clear at top, but if a foot the better, that there may be due room to lay the layers, at the proper season, for a further increase, which is an essential point to be considered.

The pots being ready, put some pieces of tile or oyster shells over the holes at the bottom; add plenty of drainage, and fill them halfway with earth, then turn the plants out of the pots, &c., with the ball of earth about their roots; and after taking away a little of the earth around the sides of the ball, place one plant in each of the large pots, filling up the vacancy around the ball with fresh compost, bringing it also close up about the body of the plant, which should stand nearly as high as the rim of the pot; and finish each pot with a moderate watering.

Being thus potted, place them in a sheltered sunny situation in the full air, and in dry weather supply them with water twice a week, and here let them remain till they are considerably advanced towards flowering, then the fine sorts may be placed on the Carnation stage.

Summer Culture.—During dry warm weather continue the care of watering those in pots every day or two. Likewise clear out all weeds, and at times lightly stir the surface. In May and June the flower-stems of the plants will

advance, when sticks should be placed for their support, which should be two feet and a half or a yard long, either round or square, but perfectly straight, and tapering from the bottom: sharpening the lower end thrust one down by every plant, to which tie the flower-stems in a neat manner, which repeat as they advance in height.

In June, or beginning of July, the plants will be considerably advanced towards flowering, when those intended for the stage should be placed there, to prevent the depredation of slugs; the posts or supporters of the stage should be surrounded at the bottom by small cups of water; and by placing the plants on a stage, having the platform eighteen inches or two feet high, the flowers are viewed to more advantage; and if there is erected an awning over the top, supported four feet above the platform, the flowers being screened from the heat of the mid-day sun, and defended from heavy rains, are continued much longer in beauty.

Some Carnation stages are constructed upon very elegant plans, both to render them useful and ornamental.

But as to the general construction of a common Carnation stage, it is formed entirely of slight timber work, thus—a boarded platform is erected eighteen inches or two feet in height, formed by two ranges of planks, to contain two rows of pots lengthways, supported on posts, ranged either in one row along under the middle of the platform, or in two ranges, one on each side; and over is erected a roof of open work, five or six feet high, to be covered with painted canvas, supported either by a range of neat posts on each side, or by one row ranging along the middle, between the planks of the platform, which is the most eligible; the roof may be formed either archways or like the ridge of a house, having the arches or spars about a foot asunder, and stiffened by thin slips of deal, carried across them the whole length of the stage; and the roof thus formed may be covered with coarse canvas painted white.

All the wood work of the stage should be painted white, both to preserve it from the weather, and give it a more lively appearance. In constructing Carnation stages, some contrive sticks for the support of the flower-stalks, fixed to the work of the

stage, by means of small neat rails, carried along lengthways of the stage, just over the place where each row of pots stand, and from which rails upright sticks half an inch thick are carried to another such rail above, placing them at such distances that there be two to each pot, and so train the flower-stems up to the outside of the sticks.

With respect to the cups of water above mentioned, they are earthen or leaden, about fifteen inches wide, and three or four deep, having a hollow or vacancy in the middle six inches wide, like a socket to receive the posts; and is formed by a raised rim in the middle, equal in height to that of the circumference, and the hollow or socket so formed as to receive the bottom of the posts quite through to the ground; and the space between the outer and inner rim is filled with water, so that each post standing in the middle of such a cistern, sufficiently guards the plants against creeping insects, for they will not attempt to cross the water.

For want of a covered stage to screen the flowers, you may contrive a kind of small umbrellas or round spreading caps, either of tin or canvas, nine or ten inches diameter, one for each plant; having a socket in the middle to receive the tops of the support-sticks; those umbrellas which are formed of tin are the best, but if you make them of canvas, first make little round frames, having the rim formed with slips of lead, wire, cane, &c., the above width, with cross slips of the same materials; contriving a socket of lead or tin in the middle for the support-stick to go quite through, as just observed; and upon these frames paste or sow canvas, which paint with oil-colour, that they may stand the weather; either of which covers are placed over the flowers by running the support-stick up through the hole or socket in the middle, and resting the cap upon a piece of wire put across the stick at such a height from the flower as to screen it effectually from the sun and rains.

Give attention to continue to tie up neatly the flower-stalks of the plants as they advance in stature. When they are arrived at their full height, support them erect at top with wires, having a small eye or ring at one end, for the reception of the flower-stalk; so put

the other end into holes made in the support-sticks. These wires should be five or six inches long, and several holes are made in the upper part of the sticks; the first at the height of the bottom of the flower pod, the other above that, an inch or two distant; and place the wires in the holes lower or higher, that the eye or ring may be just even with the case of the calyx, to support the flower in an upright position; and by drawing the wire less or more out, the flower is preserved at any distance from the support as shall seem necessary to give it proper room to expand; and if two or three of the like wires are placed also in the lower parts of the support-sticks, placing the stem of the flowers also in the eye of the wires, all the tyings of bass, &c., may be cut away.

To have as large flowers as possible, clear off all side shoots from the flower-stem, suffering only the main or top buds to remain to flower.

When the flowers begin to open, attendance should be given to assist the fine varieties to promote their regular expansion, particularly the large burster kinds, they being apt to burst open on one side; and, unless assisted by a little art, the petals will break out of compass, and the flower become very irregular; therefore, attending every day at that period, observe, as soon as the calyx begins to break, to cut it a little open at two other places in the indentings at top, with narrow-pointed scissors, that the openings be at equal distances, and hereby the more regular expansion of the petals will be promoted; observing if one side of any flower comes out faster than another, to turn the pot about, that the other side of the flower be next the sun, which will also greatly assist the more regular expansion of the flower.

Likewise, when intended to blow any particularly fine flowers as large and spreading as possible, florists place spreading paper collars round the bottom of the flower, on which to spread the petals to their utmost expansion; these collars are made of stiff white paper, cut circular, about three or four inches diameter, having a hole in the middle to receive the bottom of the petals, withinside of the calyx, the leaves of which are made to spread flat for its support; and then spread or draw out the petals upon the collar to their

full width and extent, the longest undermost, and the next longest upon these, and so of the rest quite to the middle, observing that the collar must nowhere appear wider than the flower when it begins to burst.

Continue the care of watering the pots, which in dry hot weather will be necessary every day, being essential to promote the size of the flowers, and increase the strength of the shoots of the plants at bottom for layers.

And as in June and July these layers will have arrived at proper growth for layering, they should also be layered to continue your increase of the approved varieties, and so continue layering the shoots of each year's growth at the above season, managing them always as before directed.

As to the border carnations, i. e., such as you intend shall flower in borders or beds, in the open ground, any of the varieties may be employed; and their propagation both by seed and layers is the same as already directed. The season for transplanting them into the places of their final destination for flowering, is October or beginning of November, for the autumn planting; and for that of the spring, any time in March or first fortnight in April; removing them with little balls about their roots, planting them about two feet from the edge of the border; and as to culture, it is principally tying up the flower-stalks as they advance in stature, and to make layers of all the approved sorts annually, in June or July.—*Abercrombie*.

Carnation Pots.—The pots commonly made and used for the purpose of blooming carnations in, are called wide-mouthed twelves. Two plants are put in each pot, and they are made wide at the top for the convenience of layering the plants in.

Disease.—The “black spot” on the leaves of carnations, is an infection propagating itself in the same manner as rust in corn, or mildew of plants, each spot being composed of innumerable small fungi.

CAROB TREE. *Ceratonia*.

CAROLINEA. Four species. Stove evergreen trees. Cuttings. Rich loamy soil.

CARPINUS. Three species, and as many varieties. Hardy deciduous trees. Seeds or layers. Common soil.

CARPODONTUS lucida. Green-house evergreen tree. Cuttings. Peat and loam.

CARRICHTERA vella. Hardy annual. Seeds. Common soil. A dry situation suits it best.

CARROT. (*Daucus carota.*) "The Carrot is a hardy biennial. The root of the plant in its wild state is small; dry, sticky, of a white colour, and strong flavoured."

Varieties.—Those with a regular fusiform root, are named long carrots; and those having one that is nearly cylindrical, abruptly terminating, are denominated horn carrots. The first are employed for the main crops, the second, on account of their superior delicate flavour, are advantageously grown for early use, and for shallow soils.

"The principal sorts are the Long Orange, best for the main crop; the Early Horn, for early summer use; and the Altringham and Large White, for field culture.

"The cultivation of all the varieties is the same. The plant requires a deeply dug or ploughed soil, in good tilth, otherwise the root is apt to branch or become forked. For the early supply drill the seed (allowing 12 or 14 inches space between the drills), in a warm protected border, any time during spring; the main crop need not be put in before its close. When the plants are up two or three inches in growth, they will require thinning, and cleaning from weeds, either by hand or small hoeing; thin from three to five inches distance, such as are designed for drawing, in young and middling growth; but the main crop, intended for large and full sized roots, thin to six or eight inches distance; keep the whole clean from weeds in their advancing young growth.

"To preserve them during the winter, remove them to the cellar, and pile them up with alternate layers of earth or sand; or they may be placed in heaps in the garden, with sufficient soil over them to exclude frost. The Carrot is a tolerably hardy root, and but little difficulty attends its preservation.

"It is a valuable food for stock, and in an especial manner worthy of extensive field culture. When grown for that purpose sow in drills three feet apart, and cultivate thoroughly—the Long Orange is perhaps the best even

for this purpose—does not grow so large as the White, but is of superior quality."—*Rural Register.*

To obtain Seed.—Leave some where raised, but if this is impracticable, some of the finest roots should be selected, and their tops not cut so close as those for storing; these likewise must be placed in sand until March, then to be planted out two feet asunder, in a stiff loamy soil. Those left where grown, or those planted at the close of autumn, must, during frosts, have the protection of litter, it being invariably removed, however, during mild weather. As the seed ripens in August, which is known by its turning brown about the end of August, each umbel should be cut; for if it is waited for until the whole plant decays, much of the seed is often lost during stormy weather. It must be thoroughly dried by exposure to the sun and air, before it is rubbed out for storing. For sowing, the seed should always be of the previous year's growth; if it is more than two years old it will not vegetate at all.

CARROT MAGGOT. This underground enemy of the carrot is banished by mixing spirit of tar with sand until saturated, and applying it to the soil previously to digging, at the rate of about one gallon to sixty square yards.—*Gard. Chron.*

CARROT MOTH. See *Tinea*.

CARTHAMUS. Two species. Hardy annuals. Seeds. Sandy loam or common soil.

CARTONEMA spicatum. Stove herbaceous perennials. Seeds. Sandy peat.

CARUM carui. Caraway. Hardy biennial. Seeds. Common soil.

CARYA. Ten species, and some varieties. Hardy deciduous trees. Seeds or layers. Common soil.

CARYOCAR. Three species. Stove evergreen trees. Cuttings. Sandy open loam, or loam and peat.

CARYOPHYLLUS aromaticus. Clove Tree. Stove evergreen tree. Cuttings. Sandy peat and loam.

CARYOTA. Three species. Stove palms. Seeds. Rich soil and a moist warm atmosphere.

CASCADE, or Waterfall, is an important adjunct in landscape gardening, but agreeable only when properly associated with the scenery around; that association is a bold broken ground, and

a dense plantation of trees; nothing is more misplaced or tasteless than a sheet of water falling into another uniform collection of water, in an open unwooded plain. Mr. Whateley justly observes, that "a rill cannot pretend to any sound beyond that of a little waterfall; the roar of a cascade belongs only to larger streams: but it may be introduced by a rivulet to a considerable degree, and attempts to do more have generally been unsuccessful; a vain ambition to imitate nature in her great extravagancies betrays the weakness of art. Though a noble river throwing itself headlong down a precipice be an object truly magnificent, it must however be confessed, that in a single sheet of water there is a formality which its vastness alone can cure, but the height, not the breadth is the wonder: when it falls no more than a few feet, the regularity prevails, and its extent only serves to expose the vanity of affecting the style of a cataract in an artificial cascade; it is less exceptionable if divided into several parts, for then each separate part may be wide enough for its depth; and in the whole, variety, not greatness, will be the predominant character. But a structure of rough, large, detached stones cannot easily be contrived of strength sufficient to support a great weight of water, it is sometimes from necessity almost smooth and uniform, and then it loses much of its effect: several little falls in succession are preferable to one greater cascade, which in figure, or in motion, approaches to regularity.

"When greatness is thus reduced to number, and length becomes of more importance than breadth, a rivulet vies with a river, and it more frequently runs in a continued declivity, which is very favourable to such a succession of falls. Half the expense and labour which are sometime bestowed on a river to give it at the best, a forced precipitancy in any one spot only, would animate a rivulet through the whole of its course; and after all the most interesting circumstance in falling waters, is their animation: a great cascade fills us with surprise, but all surprise must cease; and the motion, the agitation, the rage, the froth, and the variety of the water are finally the objects which engage the attention; for these a rivulet is sufficient, and they may there be produced

without that appearance of effort which raises a suspicion of art. To obviate such a suspicion, it may sometimes be expedient to begin the descent out of sight; for the beginning is the difficulty: if that be concealed, the subsequent falls seem but a consequence of the agitation which characterizes the water at its first appearance, and the imagination is, at the same time, let loose to give ideal extent to the cascades; when a stream issues from a wood, such management will have a great effect, the bends of its course in an open exposure may afford frequent opportunities for it, and sometimes a low broad bridge may furnish the occasion, a little fall hid under the arch will create a disorder, in consequence of which, a greater cascade below will appear very natural."

CASCARIA. Six species. Stove evergreen shrubs. Cuttings. Sandy loam.

CASINE. Seven species. Green-house evergreen shrubs. Ripe cuttings. Loam and peat.

CASSIA. One hundred species. Chiefly stove or green-house evergreen shrubs. Some are annuals, and a few herbaceous perennials. Cuttings. Light loamy soil, or loam and peat.

CASSINIA. Five species. Green-house evergreen shrubs. *C. aurea* is an herbaceous perennial. *C. spectabilis*, an evergreen annual. Division, cuttings, or seed. Loam and peat.

CASTANEA. Chestnut. Five species and some varieties. Hardy deciduous trees. *C. indica* is a stove evergreen. Seeds or grafts. Common soil.

CASTANOSPERMUM australe. Green-house evergreen fruit tree. Layers. Loamy soil.

CASTELEA erecta. Stove evergreen tree. Cuttings. Peat and loam.

CASTILLEJA. Four species. The stove evergreen shrubs succeed in loam and peat, and increase by cuttings. The hardy herbaceous and annuals by division or seeds. Sandy peat.

CASUARINA. Nine species. Green-house evergreen trees. Cuttings. Sandy loam and peat.

CATALPA. Three species. Hardy deciduous and stove evergreen trees. Seed, layers, or cuttings. Loam and peat.

CATANANCHE. Two species. *C. cærulea*, hardy herbaceous perennial. *C. lutea*, an annual. Seed. Common soil.

CATAPHAGUS, a synonyme of *Elater*. See *Wireworm*.

CATASETUM. Seventeen species and some varieties. Stove epiphytes. Division. Wood.

CATCHFLY. See *Silene*.

CATERPILLAR. This is the young of either the butterfly or the moth, in its first state after emerging from the egg. There are many kinds, and the best mode of preventing their invasions, is to destroy every *butterfly, moth, chrysalis*, and egg that can be found. Hand-picking, dusting with lime, or soot, and other modes of destroying the caterpillar, are mentioned when noticing the plants they attack. Wherever a solution of ammonia, in the proportions of one to nine of water can be applied by the syringe, it will destroy many minute caterpillars undiscerned by the eye. Sparrows and other small birds in early spring should not be scared from the garden, for they destroy myriads of caterpillars. At that season they can do no harm if the gardener properly guards his seed beds. Boys paid a half-penny per dozen for leaves having eggs or smaller caterpillars upon them, have been found to keep a garden free for a whole season for about seven shillings.

CATESBÆA. Three species. Stove evergreen trees and shrubs. Cuttings. Light turfy loam and peat.

CATHARANTHUS. Two species and varieties. Stove evergreen shrubs. Seeds or cuttings. Common soil.

C. pusillus is an annual, and requires a light rich soil.

CATTLEYA. Twenty-two species and some varieties. Stove epiphytes. Division. Wood.

CAULIFLOWER. (*Brassica oleracea cauliflora*.)

"The *Cauliflower* is one of the most delicate and curious of the whole brassica tribe; the flower-buds forming a close, firm, cluster or head, white and delicate, and for the sake of which the plant is cultivated.

"These heads or flowers being boiled, wrapped generally in a clean linen cloth, are served up as a most delicate vegetable dish. 'Of all the flowers in the garden,' Dr. Johnson used to say, 'I like the Cauliflower.'

"For the early supply of the London market very great quantities of Cauliflowers are fostered under hand-glasses during winter and the first part of

spring; and to behold some acres over-spread with such glasses, gives a stranger a forcible idea of the riches and luxury of the metropolis. In Europe it is had in fine perfection during a great portion of the year, and with scarcely more trouble than attends the growing of the cabbage. But in this country it is at best very uncertain, and unless the summer prove cool, seldom succeeds.

"For the main summer crop sow the seed early in autumn, and that it may vegetate freely, observe the directions for sowing Broccoli. Having succeeded in getting the seeds to sprout, an occasional watering is given if dry weather ensue. The plants remain in the seed-bed until the close of autumn, by which time they will be good sized plants, having four or five leaves. Then place a frame provided with a sash, in a sheltered situation, on rich earth, deeply dug, loose, and finely raked, in which the plants should be pricked out at distances of two to three inches square. When the bed is filled, water them gently through a fine rose. Thus they remain until frosty nights render it prudent to run on the sash; observing to remove the sash entirely in very fine days, or elevate to a greater or less degree, as the temperature of the atmosphere demands. Even in cool weather during the winter, more or less air should be admitted, especially if the sun shine; taking care to put down the sash before sunset, and covering all snug for the night. During mild showery weather the sash should be occasionally drawn off, which will refresh the plants.

"As the winter advances and cold increases, a mat covering at night will be requisite, and as the weather becomes still colder, an additional one, or a quantity of loose straw so placed over the sash, and round the edges, that the severe frost may be excluded.

"As early in the spring as the weather will admit, prepare a piece of ground to plant them in; let it be deeply dug, and richly manured with thoroughly decomposed stable dung. In selecting the ground in which to plant them, choose that which is convenient to water, for in dry seasons, irrigation will promote their growth, and increase the chance of success. (Select the evening for watering, having previously drawn

the earth around each plant, in the form of a basin.)

“Before removing the plants from the beds, mark as many of the strongest as the frame will hold, allowing eighteen inches square to each plant; there permit them to remain undisturbed, retaining the sashes, and treating them as if in a hot-bed. They will come forward before those transplanted, and frequently do well, when the latter fail. We would advise that the plants to be put out, be divided, one half placed on a warm border with southern exposure, under the lee of a building or board fence, the others in an open compartment of the garden.—For this reason, if the spring prove cold, those on the border will be hastened and protected from late frosts, and if the early part of summer prove dry and hot, those in the open compartment will be more favourably situated. Hand glasses, flower pots, or boxes put over them at night, during cool weather, are highly advantageous. When they begin to show signs of heading, break a leaf over them, to protect from the direct rays of the sun.

“*To force Cauliflowers*; make a hot-bed at close of winter, planting them therein, from the cold bed or frame, at the distances of fifteen inches. A pretty free admission of air is necessary, otherwise they will advance too rapidly, and become weak and spindling; during mild days in April, the sash should be drawn off, and as the weather becomes warm, plentiful irrigation should be administered.

“*Late Cauliflowers* are sown at the same time with the Broccoli; they head as it does, and require similar treatment, though not so certain to succeed.” —*Rural Register*.

CEAXOTHUS. Twenty-two species. Chiefly stove or green-house evergreen shrubs; some are hardy deciduous. *C. perennis* is herbaceous. Cuttings. Peat and loam.

CECIDOMYIA. *C. nigra*. Black Gall Midge. This insect lays its eggs in the blossom of the pear early in the spring, and the larvæ thence born consume the pulp of the embryo fruit. Sometimes they eat their way through its skin, and at others remain within its core until it falls.

CECROPIA. Three species. Stove evergreen trees. Cuttings. Loam and peat.

CEDAR OF GOA. *Cupressus lusitanica*.

CEDAR OF LEBANON. *Cedrus Libani*.

CEDRELA. Three species. Stove evergreen trees. Cuttings. Light loam.

CEDRUS. Cedar. Two species. Hardy evergreen trees. Seeds. *C. deodara*, grafts readily on the common larch. Sandy loam.

CELASTRUS. Twenty-seven species. Chiefly green-house or stove evergreen shrubs, trees, or climbing plants. *C. bullatus* and *C. scandens*, are hardy deciduous climbers. Ripe cuttings. Sandy loam and peat.

CELERIAC, or TURNIP-ROOTED CELERY (*Apium rapaceum*).

Time and Mode of Sowing.—It may be sown in March, April, and May, to afford successive plantations in June, July, and August. The seed must be sown in drills six inches apart, and kept regularly watered every evening in dry weather, otherwise it will not germinate. The bed must be kept free from weeds, and when about three inches high, they may be pricked out into another border in rows three inches apart each way; giving water abundantly and frequently: by adopting the precautions mentioned in the cultivation of celery, the same seed bed will afford two or three distinct prickings. In the neighbourhood of Dresden, where this vegetable is grown in great perfection, they sow in February or March, in a hot-bed under glass, and the plants are removed in April, when two or three inches high to another hot-bed, and set an inch and a half apart. The fineness of the plants is there attributed to the abundance of water with which they are supplied.

When five or six inches high, they are fit for final planting; they must be set in rows two feet asunder, and the plants eight inches apart, on the level ground, or in drills drawn with the hoe at most three inches deep, as they do not require earthing up. In dry weather they should be watered plentifully, at least every other evening. The only additional attention they require, is to keep them free from weeds. They require a very light fertile soil.

Saving Seed.—The directions given for saving the seed of Celery, are in every respect applicable to this vegetable.

CELERY. (*Apium graveolens*). "The Celery is a hardy biennial plant, a native of Britain, and known in its wild state, by the name of smallage; the whole plant has a rank coarse taste, and the effects of cultivation in producing from it the mild sweet stalks of Celery, are not a little remarkable.

"The blanched leaf stalks are used raw as a salad; they are also stewed, and put in soups. In Italy the unblanched leaves are used for soups, and when neither the blanched nor the green leaves can be had, the seeds bruised, form a good substitute.

"In Europe, they enumerate several varieties of Celery, two only of which we cultivate, viz: Large Solid Stalked White, Large, Solid, Stalked Red.

"It delights in damp rich soil, deeply dug, and heavily manured with decomposed vegetables or manure, from the barn yard, thoroughly rotted.

"For a very early crop, sow the seed in a hot-bed very early in the spring, either by itself, or among Radishes, Salad, or Cabbage. For the main autumnal and winter supply, sow in the open ground on a damp spot, conveniently situated to apply water, which give freely in dry weather, even after the plants are well grown.

"That intended for the early supply, may be planted out by the close of spring. Make several plantings through the early part of summer, of such as are intended for the later supply.

"It will greatly strengthen the plants if they be transplanted into nursery beds, after they attain the height of two or three inches. Such beds it is recommended to form 'of old hot-bed dung, (decomposed manure from the barn yard will answer the same purpose,) very well broken, laid six or seven inches thick on a piece of ground which has lain some time undisturbed, or has been made hard by compression; the situation should be sunny; the plants set six inches apart in the dung *without soil*, water well when planted, and frequently afterwards.' From this bed they are in due time transplanted, where they are to remain. A stalk which had been thus treated, was raised near Manchester, which weighed nine pounds when washed, with the roots and leaves attached to it, and measured four feet six inches in height.

"When the plants in the seed-bed, or

those which have been transplanted into the nursery-bed just described, have reached the height of six to twelve inches, they may be removed into the trenches for further growth and blanching. These trenches are formed in deep well cultivated soil, in straight lines, three feet apart, twelve to fourteen inches wide, and six inches deep, incorporating with the soil abundance of well rotted manure; therein set the plants, four or five inches apart, (having removed them with all their roots, cut off the straggling fibres, and a third of the tops, and slit off the suckers or side shoots,) water them freely, and shade them from the hot sun for some days. Experience has shown that this vegetable may be more successfully cultivated by having a liberal portion of manure placed on the surface around the plants, rather than by the old plan of placing it in excessive quantity in the bottom of the trench, which in dry seasons frequently injure the plants. Cedar brush, corn stalks, or boards, laid across the trenches, afford ample shade, for the newly transplanted plants, observing to remove them in the evening, and replace them in the morning. In the course of a few weeks, the plants will have grown sufficiently to admit of 'earthing up,' which is performed by drawing the loose earth around the stalks, taking care to keep the leaf stems together, and the heart of the plant uncovered. The operation should be gradual, not drawing at once too great a body of earth around them, lest its application should cause the young shoots to rot. It is not advisable early to commence earthing up, such as are intended for the late autumn and winter supply, because the plant soon perishes after it becomes fully blanched, especially in warm weather.

"To preserve Celery during the winter, is sometimes attended with trouble, the frequent changes of temperature in our climate causing it to decay. The usual practice is to cut down the earth of one row in a perpendicular line near the plants, against which, as if it were a wall, the stalks from the other rows are compactly arranged, tops erect; the earth is then banked up as before, and again cut down, to make room for another row, thus continuing, until the entire crop is placed side by side, within the compass of a single bed.

On either side of the bed, earth is piled up to the thickness of three feet at least. On the top, (through which the extreme ends only of the plants appear,) some dry straw litter is placed, to save them from the frost, and keep them green. Boards placed over the beds so as to turn off the rain, are very useful, for much moisture frequently proves ruinous. In taking out for use, begin at one end, digging down to the roots, always observing to keep the aperture closed with straw.

"Some take up the crop on the approach of winter, and place it in a cellar, with alternate layers of dry sand; but it is apt, when thus treated, to become tough and wilted."—*Rural Reg.*

To Save Seed.—To raise seed, some plants must be left where grown, or in February or March, some may be carefully taken up, and after the outside leaves are cut off and all laterals removed, planted in a moist soil a foot apart. Those which are most solid, and of a middling size, are to be selected. When they branch for seed, they must be early attached to a stake to preserve them from being broken by the violence of winds. The flower appears in June, and the seed is swelling in July; if dry weather occurs they should be watered every other night. In August the seed will be ripe, and when perfectly dry, may be rubbed out and stored.

CELOSIA. Cockscomb. Fourteen species and some varieties. Chiefly stove or green-house annuals. *C. echinata*, *C. glauca* are evergreen shrubs. Seeds. Rich mould. See *Cockscomb*.

CELSIA. Nine species. Chiefly half hardy biennials, some stove annuals. *C. orientalis* is a hardy annual. Seeds. Peat and loam.

CELTIS. Eleven species and two varieties. Stove evergreen trees or hardy deciduous trees and shrubs. Seeds or layers. Common soil.

CENTAUREA. One hundred and fifty-two species and some varieties. Chiefly hardy and half hardy herbaceous perennials; a few annuals and biennials. *C. ragusina* is a green-house evergreen shrub. Seeds. Division. Common soil.

CENTRANTHUS. Three species, and variety. Hardy annual and herbaceous perennials. Seeds. Common soil.

CENTROCARPHA. Nine species. Chiefly hardy herbaceous perennials.

Two are biennial. Seeds. Division. Common soil.

CENTROCLINIUM. Two species, one a stove annual, the other an evergreen shrub. Seeds. Light vegetable soil.

CENTROSPERMUM *chrysanthum*. Hardy annual. Seeds. Common soil.

CENTAURY. *Centaurea*.

CENTUNCULUS *minimus*. Bastard pimpinell. Hardy annual. Seeds. Sandy loam.

CEPHAELIS. Eight species. Stove evergreen shrubs, two are trailing plants. Cuttings. Peat and sandy loam.

CEPHALANTHERA. Three species. Hardy orchids. Division. Peat and loam.

CEPHALANTHUS *occidentalis* and variety. Hardy deciduous shrubs. Ripe cuttings or layers. Sandy peat and loam.

CEPHALOTUS *follicularis*. Green-house herbaceous perennial. Offsets. Boggy soil.

CERANTHERA *subintegrifolia*. Stove evergreen shrub. Cuttings. Sandy loam.

CERASUS. Twenty-eight species and many varieties; chiefly hardy deciduous fruit trees and shrubs, a few evergreens. *C. occidentalis*, and *C. sphaerocarpa*, are stove evergreens. Seeds. Budding or grafting.

CERATIOLA *ericoides*. Half hardy green-house evergreen under shrub. Cuttings. Sandy peat.

CERATOPETALUM *gummiferum*. Green-house evergreen tree. Cuttings. Sandy loam.

CERERA. Six species. Stove evergreen trees or shrubs. Cuttings. Rich mould.

CERCIS. Two species and varieties. Hardy deciduous trees. Seeds. Light loamy soil.

CEREUS. One hundred and thirty-one species. Stove cactaceous plants. Cuttings, dried before planting. Sandy loam.

CERINTHE. Five species. Hardy annual or biennial plants. Seeds. Common soil.

CEROPEGIA. Thirteen species. Stove or green-house evergreen twining or deciduous climbing plants, tuberous rooted perennials and evergreen shrubs. Cuttings. Sandy loam.

CESTRINUS *carthamoides*. Hardy

herbaceous perennial. Division. Common soil.

CESTRUM. Twenty-eight species. Stove and green-house evergreen shrubs. Cuttings. Peat and loam. *C. aurantiacum* is the prettiest species for the green-house.

CETONIA aurata. Green rose chafer, is most severely felt by the gardener when it attacks his strawberries, which it does in May or June. It is described by Mr. Curtis as being "one of our largest and most beautiful beetles, being of a bright burnished green, often reflecting a rich golden or copper tint; the horns are short with a small club. The scutellum forms an elongated triangle; the wings are very long, brownish, and folded beneath the horny wing-cases, which have a few scattered white lines placed transversely, resembling cracks in the green epidermis; the under side is of a fine copper tint often inclining to rose colour. From its nestling and reposing in the flower of the rose, it is generally called the rose-chafer, but it is also attached to the white-thorn, candy-tuft, elder, mountain-ash, pæony and strawberry, the flowers of which it feeds upon. The female rose-chafers lay their eggs in the ground, and the larvæ they produce are no doubt often confounded with those of the cock-chafer (*Melolontha vulgaris*), being as large and very similar, and probably, under the name of "Leverblanc," they have contributed in no small degree to augment the ravages in the rose-tree nurseries of France. Although these larvæ are very much alike, it is not difficult to distinguish them, those of the rose-chafer being downy, and covered with transverse series of short hairs; and the feet are pointed; whereas, the grubs of the cock-chafer are naked, and the feet are blunt and rather dilated at the trips.

"These maggots are fat, the head-horns and six pectoral feet are rusty ochreous; the tips of the strong jaws are black, the extremity of the abdomen is of a pale ink colour from the food shining through the transparent skin; but in the rose-chafer there is a large horny bright rust-coloured spot on each side of the first thoracic segment. The simplest remedy is to collect the beetles, which are large and conspicuous, into bottles or cans of water, in the morning and evening, or in dull

weather during the day, for they fly very well, when the sun shines, which renders it difficult to capture them unless a net be used: when the search is ended, the contents of the vessel should be emptied into boiling water."—*Gard. Chron.*

CHÆTACHLÆNA odorata. Green-house herbaceous perennial. Seed. Sandy loam.

CHÆTANTHERA. Two species. Green-house herbaceous perennials. Division. Peat and loam.

CHÆTOCALYX vinctina. Stove evergreen climber. Cuttings. Peat and loam.

CHÆTOGASTRA. Two species. Stove annual and herbaceous perennial. Seed. Peat and loam.

CHALK. Carbonate of lime, contains, when pure—

Carbonic acid 45

Lime 55

But as it usually occurs it contains about twenty-four per cent. of water, and five per cent. of silica (flint), alumina (clay), and oxide (rust) of iron. After these deductions it will be apparent that if fifty tons of lime be applied to land, it will be equal to more than one hundred of chalk, a subject worthy of consideration when it has to be conveyed from afar. Chalk is usually employed in large quantities to improve the staple of a soil. It makes heavy soils less retentive of moisture, and light sandy soils more retentive. On wet sour lands it neutralizes the acids which render them unproductive. Some chalks contain phosphate of lime, and this being a constituent of all plants, such chalk is to be preferred. Some contains a large proportion of carbonate of magnesia, which is less beneficial.

CHAMÆDOREA. Two species. Palms. Rich sandy loam. Suckers.

CHAMÆLEDON procumbens. Hardy evergreen shrub. Layers. Sandy peat.

CHAMÆLIRIUM carolinianum. Hardy herbaceous perennial. Division. Peat and loam.

CHAMISSOA altissima. Stove evergreen shrub. Cuttings. Common soil.

CHAMÆROPS. Seven species. Palms. Suckers. Rich mould.

CHAMOMILE. *Anthemis*. See *Camomile*.

CHIAPTALIA tomentosa. Hardy herbaceous perennial. Division. Common soil.

CHARCOAL. Soot, a chief constituent of which is charcoal, has long been known as a very effective fertilizer; and burning has still longer been known as a mode of reducing stubborn soils to prompt productiveness. But both these sources of fertility might owe their efficiency to other causes than their affording carbon to plants; and it is only within these very few months that anything like a general knowledge has been diffused that mere charcoal is one of the best of manures. The fact has been known for many years to individuals, as, for example, to Mr. Barnes, of Bicton; but it is only very lately that gardeners generally have learned, and I am happy in being able to join my voice to that excellent cultivator's in announcing, that—charcoal is a most efficient manure to all cultivated plants, especially to those under glass. Heaths, rhododendrons, cucumbers, roses, orchidaceous plants, hydrangeas, camellias, melons, and pine apples, have been the subjects of extended and most successful experiments. The advocates are too well known to require more than naming, for among them are Dr. Lindley, Mr. Barnes, Mr. Maund, Mr. Snow of Swinton Gardens, Mr. Stewart of Stradsett Hall Gardens, and Mr. Rivers. I think no cultivated plant would be unbeneftited by having charcoal applied to the soil in which it is rooted. It should be broken into small pieces, about the size of a nut, and for potted plants may be mixed in the proportions of one part charcoal to twenty parts earth. If applied to the open ground, one-fourth of a bushel may be sown over a square rod, and dug in just before inserting the crop. The reason of charcoal being so useful as a manure is very apparent. MM. Sennebier, Ruckert, Saussure, and others, have demonstrated that plants are rendered much more luxuriant and productive, by having carbonic acid applied to their roots, than other plants to whose roots no such application was made. Now charcoal kept moist, as when buried in the soil, slowly combines with oxygen, and emits carbonic acid—in fact, it slowly dissolves. I am sorry to differ from such an authority as Liebig, who broadly asserts that “Carbon never combines at common temperatures with oxygen, so as to form carbonic acid.” This was

long since shown to be otherwise by Count Rumford; and may easily be demonstrated to be incorrect, by confining a few ounces of fresh and moistened charcoal powder, mixed with earth, in a glass receiver full of oxygen, over lime water; carbonate of lime will form, showing the gradual evolution of carbonic acid. The following communication from Mr. Barnes shows, that carbonized vegetables are a better manure for onions than even bone-dust.

“A piece of ground that was cropped with coleworts last autumn, (1843), was cleared early, and the refuse trenched in during the winter. 95 feet in length and 10 feet in width, was planted with small onions on the 14th of February, which onions had been sown the second week of September in the previous autumn. They were planted in rows one foot apart, and six inches from plant to plant—with the intention of drawing every alternate one for use through the summer—but the whole nine rows did not get entirely thinned. The following is the weight when ripe for storing on the 1st of August.

“Five rows grown where 4 lbs. of bone-dust to each row had been sown in a drill drawn 3 inches deep and filled up, and the onions planted over it—producing 420 lbs. weight of onions—each row yielding from 82 to 88 lbs.

“The other 4 rows had applied to them of fresh dry charred refuse and ashes, made from the garden rubbish-heap, two common buckets full, weight 14 lbs. They produced 366 lbs. of onions, the rows weighing respectively 99, 89, 95, and 83 lbs. The last row being injured by a row of red cabbage growing near.

“Many of the foregoing onions, which were a mixture of the Globe, Deptford, and Reading, measured in circumference from 14 to 16½ inches, and weighed as many ounces. I weighed 12 together, that turned the scale at 12 lb. 9 oz. I can only fancy what a wonderful saving and benefit it would be to the country, to char the refuse of old tan, chips, sawdust, ditch scourings containing sods, weeds, bushes, and refuse. By keeping the surface of the earth well stirred, no crops appear to suffer by drought that are manured by charrings, but continue in the most vigorous health throughout

the season, never suffering materially by either drought or moisture.”

On spring sown onions and on turnips, Mr. Barnes finds charred or carbonized vegetable refuse equally beneficial. Three rows, each 95 feet long, of the white globe onion, manured with bone-dust, weighed 251 lbs.; whilst three similar rows of the same variety, and grown under precisely similar circumstances, but manured with char-rings, weighed 289 lbs.

CHARD. See *Artichoke*.

CHARDOON. See *Cardoon*.

CHARÆAS *graminis*. Antler or grass moth, has a yellowish-brown head and back—upper wings brownish grey, appears in July and August. Its caterpillar brown or blackish, with five lighter stripes down the back. This lives at the roots of grasses, and eats their young blades.

CHASMONIA *incisa*. Hardy annual. Seeds. Common soil.

CHEILANTHES. Fourteen species. Ferns. Green-house, stove or hardy herbaceous perennials. Division. Peat and loam.

CHEIMATOBIA *brumata*. Winter moth. This is the parent of that scourge of fruit trees, the greenlooper caterpillar. It appears in November. One female will lay 200 eggs, depositing them on the bends and bark of the upper branches of the apple and other fruit trees. The caterpillars appear with the bursting of the buds, on the tips of the leaves, petals, and calyxes of which they feed. They form a small web within the blossom, and glue and gnaw its petals so as to destroy it. When the fruit is formed, that becomes their favourite food. They descend and bury themselves in the earth, to assume the chrysalis form about the

end of May. Frosts in November, ants and birds, are their natural enemies. As the females have no wings, a thick coating of gas-lime sprinkled a foot broad over the surface, round the stems of fruit trees at the end of October, and renewed once or twice in November and December, would prevent their ascent; or a broad band of bird lime might be smeared round the stems themselves. An advantage of espalier and dwarf fruit trees is, that their buds are easily examined for these caterpillars and other marauders.

CHEIRANTHUS. Eleven species, and many varieties. Green-house or half-hardy evergreen shrubs. *C. fruticosus*, *C. ochroleucus* are hardy herbaceous perennials. Cuttings. Rich common soil. See *Wallflower*.

CHEIROSTEMON *platanoides*. Stove evergreen tree. Leafy cuttings. Sandy loam.

CHELIDONIUM. Two species.—Hardy herbaceous perennials. Division. Common soil.

CHELONE. Seven species. Hardy herbaceous perennials. Division. Peat and loam.

CHENOLEA *diffusa*. Green-house evergreen shrub. Cuttings. Light rich soil.

CHERLERIA *sedoides*. Hardy herbaceous perennial. Division. Sandy loam and peat.

CHERMES. See *Psylla*.

CHERRY. (*Cerasus*.)

Varieties.—There are eighty in the London Horticultural Society's list, of which some are quite inferior and others scarcely differ except in name. The following we extract from the Catalogue of D. Landreth & Fulton, Philadelphia:

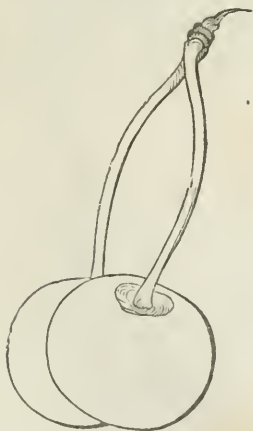
EXPLANATION OF ABBREVIATIONS.—*Colour*—b black; l light; r red
y yellow. *Size*—L large; M medium; s small.

*Those marked * are of American origin.*

NAME.	COLOUR.	FORM.	SIZE.	QTY.	SEASON.
Belle de Choisey	r	round	M	1	June
*Bleeding Heart	b	heart	L	1	June
Black Tartarian	b	heart	L	1	June
Carnation	l r	round	L	2	July
*Downer's Late Red	l r	round	L	1	July
Downton	l r	round	L	1	July
Knight's Early Black	b	round	L	1	June
Late Duke	r	heart	L	1	July
May Duke, Early	r	heart	L	1	June
Mazzard Black	b	round	s	2	July
Morello, English	r	heart	L	1	July
Morello, French	r	heart	L	1	July
Morello, Plumstone	r	heart	L	2	July
Morello, Kentish	r	heart	L	1	July
*Morelle, Rumsey's Late	r	heart	L	1	August
Ox Heart	y r	heart	L	1	July
White Heart	y r	heart	L	1	July
Yellow Spanish	r	heart	L	1	July

The annexed drawings and descriptions of a few valuable varieties may interest some of our readers.

Fig. 23.



BELLE DE CHOISEY. *Thomp.: Pom. Mag. (Cereise Doucette, Cereise Palombre.)* (Fig. 23.) "The Bon Jardinier speaks highly of this variety,

which was produced at Choisey, near Paris, many years ago. It has proved hardy and well adapted to this country, and we can recommend it as among the very best of its class. The fruit is middle sized, roundish; skin red, mottled with amber, exhibiting the flesh

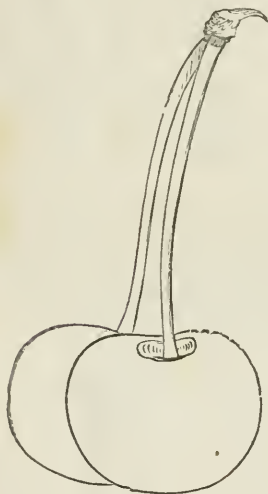
Fig. 24.—(P. 142.)



beneath, which is amber coloured, delicate and sweet. The habit of the tree is not unlike the well known May Duke, with which it ripens."—*Rural Reg.*

CARNATION. *Thomp.*: *Lind.*: *Coxe.* (Fig. 24.) "This, though an old, is still a highly popular variety. Coxe says, 'one of our most excellent Cherries.' More recently introduced sorts have divided our attention, but it is among those most frequently ordered from the Nurseries. The size is large, round. Skin beautifully variegated, red and yellow. It ripens in July, and hangs long without decaying: highly esteemed for preserving."—*Rural Reg.*

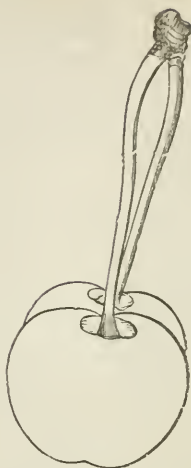
Fig. 25.



Downton. *Lind.*: *Thomp.* (Fig. 25.) "The Downton is especially valuable from its time of ripening, which is after most good cherries have declined, or disappeared. The fruit is roundish, of large size, and of prepossessing appearance. Skin creamy white, red on the sunny side. Flesh yellowish, rich and well flavoured."—*Rural Reg.*

MAY DUKE. *Miller*; *Lind.*: *Thomp.* (Fig. 26.) It would occupy some space to enumerate all the English and French synonymes of this widely known, and as widely esteemed variety. Perhaps the entire catalogue of the London

Fig. 26.



Horticultural Society does not contain one so universally esteemed. Downing justly remarks, among all the new varieties, none has been found to supplant the May Duke.

The fruit is large, obtusely heart shaped, produced in clusters; when perfectly ripe of a deep purple hue. Flesh tender, juicy, and when in perfection, all that can be desired in a

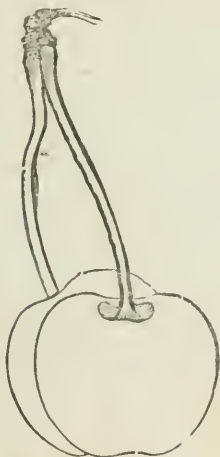
Fig. 27.—(P. 143.)



cherry. Ripens at Philadelphia, latter end of May and early in June.

PLUM STONE MORELLO. *Thomp.*—(Fig. 27.) There is some difference of opinion as to the merits of this variety—it has, however, many admirers, and is on the whole, worthy of culture; though we cannot pronounce it of first quality. It ripens late in the season, possesses good flavour, and has a prepossessing appearance, all of which are desirable properties, and render it popular. The fruit is large, of a deep red colour. Flesh juicy and acid, as is the case with all Morellos. Ripe at Philadelphia, middle to close of July.

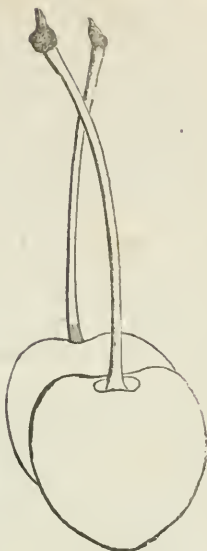
Fig. 28.



KNIGHT'S EARLY BLACK. *Pom. Mag.: Thom.* (Fig. 28.) "This is, as its name imports, one of Mr. Knight's seedlings, raised in England, about 1810. It is not, externally, unlike the Black Tartarian, of which such exaggerated descriptions have been given, ripens earlier than it—at Philadelphia, about the 1st of June. The fruit is over medium size, heart shaped. Skin deep purple, when fully ripe quite black. Flesh delicate, juicy, and well flavoured. Taken altogether it may be pronounced a cherry of the first order."—*Rural Reg.*

ELTON. *Pom. Mag.: Thomp.*—(Fig. 29.) "The Elton is an English cherry, raised in 1806. It is truly ex-

Fig. 29.



cellent, and must always remain a favourite, even though newer varieties contest the claim to our esteem. It is

Fig. 30.—(P. 144.)



above the medium size, ripens early, shortly after the May Duke. The flesh is tender, abounding in luscious juice; skin pale yellow, with a blush on the sunny side. The tree is of strong growth, and on that account additionally entitled to our regard."—*Rural Reg.*

LATE DUKE. *Pom. Mag.: Thomp. (June Duke of Core. Shippen Cherry.)* (Fig. 30.) "This is a valuable variety, similar to its predecessor, the May Duke. It ripens considerably later than it, and has the property of hanging long on the tree. The fruit is large, rather flattened; when fully ripe, rich dark red; flesh yellow, abounding in juice, scarcely so rich as the May Duke; its habit is robust; bears abundantly. Coxe calls it the most valuable cherry of the season."—*Rural Reg.*

Propagation.—Although grafting is sometimes adopted, budding is far preferable. The stock for standards should be the wild cherry, but for dwarfs or walls the mahaleb. If the stones be sown either for stocks or to raise varieties, they are best committed to the ground in September. They will vegetate the following spring, and when one year old are fit for budding if dwarfs are required, but four years usually elapse before they attain the height of six feet, required for standards.

Walls.—No fruit is more improved by a good aspect than the cherry. Allot a south wall to the best sorts, and east and west for succession. The Morello will be productive on a north wall, but on a south wall it is very superior fruit. No garden should be without one so grown.

Wall pruning.—In May or June disbud all unnecessary and foreright shoots. Train in the best-placed, lateral and terminal shoots as required. When the leaves have fallen, prune away all irregular, unproductive branches, training in their place first laterals. Never shorten a shoot unless absolutely requisite from want of space, much less prune so as to have numerous foreright spurs. All cherries bear upon very short studs with a terminal bud, on the branches from two years old and upwards. The Morello bears chiefly on the previous year's shoots, and very scantily on studs of the older branches. The Morello, therefore, requires the older laterals to be removed as often as their places can be supplied by young

shoots. All studs and foreright shoots should be removed, especially from the Morello.

Diseases.—The leaves are liable to be honey-dewed, especially in ill-drained soils; but gumming is the most weakening disease. (See *Honey-dew* and *Extravasated sap*.)

The *Aphis cerasi*, a black species, and the red spider, sometimes attack the cherry on walls; and a still rarer enemy is described as follows, by Mr. Naismith:—

"Our cherry trees, both in the open air and on the natural walls, particularly the tops of the young shoots, are much attacked with a small black insect, provincially called the black beetle. The remedy I have found most effectual for their destruction is a mixture of pitch with one-sixteenth part of powdered orpiment; one-sixteenth part of sulphur, dissolved over a slow fire in an earthen pipkin, until they be well incorporated; when cold, divide into small pieces, about the size of a hen's egg, and burn it under the trees with damp straw, directing the smoke as much as possible where the insects are most numerous. In an hour afterwards, (if the state of the fruit will admit,) give the trees a good washing with the garden engine, which generally clears off the half dead beetles, and prevents the spreading of the red spider."—*Enc. Gard.*

Forcing.—Mr. G. Shills, of Erskine House Gardens, says:—"For accelerating the ripening of cherries, I prefer the open flued wall. The cherries setting well without artificial assistance, and ripening in succession from the latter end of April till the latter end of June or beginning of July, and with sufficient rapidity to supply a family with a dish daily during that period. About the middle of February, or when the buds naturally begin to swell, a little fire-heat is supplied in the evening and in dull cloudy weather, kept up during the day; but in bright sunshine the fire is stopped about nine or ten A. M., and set on again about two P. M. This practice is followed until the middle or latter end of May, when the fire-heat is discontinued.

"A little before the expansion of the blossom, which is about the beginning of March, the net is put over the tree, by fixing the upper side of it on nails fastened in the joints of the coping near the edge, and the under side is tied to

temporary stakes about three feet in height, placed three feet from the wall. About the middle of April the woollen net or double herring-net, together with the stakes, are taken away, and a single herring-net put close over the tree, to protect the ripening fruit from birds."

—*Gard. Chron.*

The trees are trained in the fan form, with lateral bearing branches of from one to three feet in length, according to their strength, trained in between the principal branches. In all parts of the tree, these are allowed to continue several years. When they become bare of spurs, or inclined to get too luxuriant, they are cut out—young shoots to supply their place being previously prepared.

CHERVIL, Parsley-leaved. *Cherophyllum sativum*. Fern-leaved chervil, or Sweet Cicely, *C. aromaticum*, for soups, salads, &c. They are still cultivated by the Dutch, but in this country are not often found in the kitchen garden.

Soil and Situation.—The soil for these plants must be light, with a large portion of calcareous matter from superabundant moisture. The situation cannot be too open; but a shelter from the meridian sun is beneficial.

Time and Modes of Sowing.—The only sowing that can be depended upon must be performed in early autumn, immediately after the seed is ripe; for if kept until the following spring it will seldom germinate, or the seedlings are generally weak and die away, during the hot weather. If, however, it should fortunately retain its vegetative powers, it may be sown early in the spring at short intervals, for use in spring and summer, and towards the end of July for autumn supply. Sow in drills eight inches apart. The plants are to be thinned to eight inches asunder, and to remain where they are raised. The only after cultivation required by them is to be kept clear of weeds.

The perennial sort, *C. aromaticum*, must be trimmed as directed for *Sage*. The leaves are fit to be gathered when from two to four inches in growth; in doing which they should be cut close, when the plants will shoot afresh.

To obtain Seed.—Some of the autumn-raised plants must be left ungathered from; they flower in April, and ripen their seed about June. Of the other

species, some must in a like manner be left untouched; they will flower about June, and ripen their seed in July or August.

CHESTNUT. *Fagus castanea*.—In the London Horticultural Society's list are twenty varieties enumerated. If the seedlings are left ungrafted, they are about thirty years before they bear fruit, but grafts inserted upon these seedling stocks from bearing branches, afford blossoms the next year, and are fruitful much earlier.

Soil.—A dry subsoil is the great requisite for this tree. It thrives best in a sandy well-drained soil.

After-culture.—No other attention is required than to thin the over-crowded and to remove over-wrapping branches.

Nuts.—These are ripe about October. They are best preserved in sand.

CHICORY. See *Succory*.

CHICKASAW PLUM. *Cerasus chicala*.

CHILODIA. Two species. Green-house evergreen shrubs. Cuttings. Peat and loam.

CHIOGLOTTIS diphylla. Half-hardy orchid. Division. Light turfy loam, turfy peat, and sand.

CHIMAPHILA. Two species. Hardy herbaceous perennials. Cuttings. Peaty soil.

CHIMONANTHUS fragrans, and varieties. Hardy deciduous shrubs. Layers or cuttings. Loam and peat, or any common soil.

CHINA ASTER. *Callistema*.

CHINA ROSE. *Hibiscus rosasinensis*.

CHINESE TREE. *Paeonia moutan*.

CHIOCOCCA. Two species. Stove evergreen trees. Cuttings. Loam and peat.

CHIONANTHUS. Three species. Hardy and stove deciduous shrubs and trees. Seeds, buds, or grafts. Peat and loam.

CHIRONIA. Eleven species. Green-house evergreen shrubs. Cuttings. Peat and loam.

C. decussata should be potted in light rich soil, and liberally watered during the summer months. Keep it in a good situation near the glass, where it gets plenty of light and air. Always keep some young plants to take the places of the old ones.

CHITONIA. Five species. Stove evergreen shrubs and trees. Cuttings. Peat and loam.

CHIVE or **CIVE** (*Allium Schoenoprasum*). Is used as a very superior substitute for young onions in spring saladings. A single row a few yards long, will supply a family.

Soil.—A light rich soil is most suitable, but it will grow anywhere not overshadowed.

Plant the offsets of the bulbs early in spring. They are to be inserted by the dibble eight or ten inches apart, and eight or ten offsets in each hole. The only cultivation required is to keep them free from weeds. By autumn they multiply into large-sized bunches, and if required may be taken up as soon as the leaves decay, and be stored as a substitute for the onion. The leaves, which are fit for use as long as they remain green, must, when required, be cut down close to the ground, when they will speedily be succeeded by others.

CHLIDANTHUS fragrans. Green-house bulbous perennial. Division. Two-thirds sandy loam, one-third sand and peat.

CHLOANTHES. Three species. Green-house evergreen shrubs. Cuttings. Loam and peat.

CHLORA. Two species. Hardy annuals. Seeds. Common soil.

CHLORANTHUS. Three species. Stove evergreen shrubs. *C. monastache* is herbaceous. Cuttings. Loam and peat.

CHLORIDE OF LIME, or *Bleaching Powder*, is composed of

Chlorine	63.23
Lime	36.77

Exposed to the air it is converted into chalk, and muriate of lime, a salt which absorbs moisture from the air very powerfully. By this conversion it becomes a useful addition to soils; and as it also gives out some chlorine gas, so offensive and destructive to insects, it has been suggested as a useful application to the land at the time of turnip sowing.

CHLORODYLON swietenia. Stove evergreen tree. Cuttings. Peat and loam.

CHOCOLATE-NUT. *Theobroma*.

CHOISYA ternata. Stove evergreen shrub. Cuttings. Peat and loam.

CHOKE. *Cerasus hyemalis*.

CHOMELIA. Two species. Stove evergreen shrubs. Cuttings. Loam and peat.

CHORISPORA tenella, and variety. Hardy annuals. Seeds. Common soil.

CHOROMOZEMA. Eight species. Green-house evergreen shrubs. Seeds or cuttings. Peat, loam, and sand.

CHOU DE MILAN. See *Borecole*.

CHRISTMAS ROSE. *Helleborus niger*.

CHRIST'S EYE. *Inula oculus Chrisli*.

CHRIST'S THORN. *Paliurus*.

CHRYSANTHEMUM. *C. sinense*. Often designated the *Chinese chrysanthemum*.

Varieties of this flower are numerous, but the following is as good a selection as can be made. Those to which an asterisk is prefixed, are most deserving of attention:—

Abelard, quilled pink.
Achmet Bey, dark purple.
Adventure, yellow.
Annie Jane, brownish red.
Annie Salter, pale yellow.
Aristides, orange and brown.
*Beaute de Versailles, yellow.
Beauty, pale lilac.
Belvedere, buff and rose.
Bertram, purplish rose.
Bethulia, large purple.
Bicolor, white and yellow.
Bijou, white, tipped with pink.

*Campestroni, purple.
*Celestial, blush.
Champion, lemon.
Chancellor, white and pink.
Changeable, yellow.
Columbus, rose.
Compactum, white.
Comte d'Eu, light red.
Conductor, orange.
Criterion, white.
David, yellow.
De Crequi, small rosy purple.
Defiance, white.
Demosthenes, yellow and brown.
*Duc de Conigliano, crimson.
Duchess de Montebello, light rose.
Empress, lilac.
*Exquisite, white.
Flequier, dark rose.
Florabundum, dark lilac.
*Formosum, white and yellow.
General Laborde, lilac.
*Goliath, white.
Gouvain St. Cyr, orange.
*Grand Napoleon, purple.
Grandish, flesh colour.
Hardy, blush white.
Horace, purplish rose.

Horatio, fine rose.
 Imogene, light buff.
 Imperial, pale lilac.
 *Incomparable, large buff.
 Invincible, creamy white.
 Irene, fine yellow.
 Isabella, white.
 Isolier, rosy red.
 Itobate, shaded rose.
 Ivanhoe, brown.
 *King, pale rose.
 Letitia Buonaparte, blush.
 Lamarque, orange.
 Leontine, brownish red.
 Louis Philippe, purplish lilac.
 *Lucidum, white.
 Madame Mina, buff.
 *Madame Pompadour, dark rose.
 *Magnet, yellow.
 Malvina, purple.
 Marechal Soult, yellow.
 Marie, red.
 Marie Antoinette, rose and buff.
 Marquis, light rose.
 Memnon, creamy white.
 *Minerva, pink and white.
 Mirabile, white and buff.
 *Ne Plus Ultra, white.
 Old Purple.
 Orion, creamy white.
 Perfection, pale lilac.
 *Phidias, rosy red.
 Phyllis, lemon.
 Prince Albert, amaranth.
 Princess de Lamalle, rosy lilac.
 *Princess Mario, light pink.
 *Queen, rose.
 Queen Victoria, lilac.
 Queen of Gipsies, orange.
 Queen of Yellows.
 Reine de Prusse, rose.
 Rosetta, quilled pink.
 Saladin, orange purple.
 Sanguineum, red.
 Sappho, reddish brown.
 Small, brown.
 Solon, yellow.
 Surprise, white.
 Tasselled Yellow.
 Tedjini, yellowish brown.
 Timon, yellow.
 *Theresia, red.
 Triumphant, pink and buff.
 Two-coloured Incurved, yellow and brown.
 Venusta, amaranth.
 *Vesta, white.
 Victorine, light rose.
 *Victory, white.
 Zelinda, rosy blush.

Soil.—A warm sheltered well-drained border, manured with leaf mould abundantly, for the out-door plants. For those in pots, four parts light fresh turfy loam, four parts leaf mould, and one part rubbly charcoal.

In Borders, the stools require to be taken up and divided in early spring, not more than three suckers being left united, otherwise the flowers are numerous and small.

By Suckers in Pots.—Turn out the old pots in March; separate the suckers by a gentle twist; plant three suckers in a thirty-two pot; shade them and shelter in a cold frame for about a fortnight; then expose them to the sunshine; shift into larger pots as they increase in growth; place them in a gentle hot-bed in April, and keep them under the frame until the middle of May; when ten inches high, pinch off the tops of each stem. They will throw out shoots from each bud; retain only six shoots, removing all the others; plunge the pots in a sunny sheltered border; water daily in dry weather, and give liquid guano always once a week, so soon as the flower buds appear. Let the pots they flower in be sixteens, that is, nine inches in diameter at the top. Move them into a very airy green-house or conservatory, to bloom.

"The shifting of the plants in the earlier part of the summer," says a well-informed writer, "should be particularly attended to. If this is neglected, no good after-management will save them from losing their leaves, and looking badly in autumn and winter. As soon as they are fairly starting into growth, the top of each should be nipped with the finger and thumb, which will cause several shoots to spring from the under part of the plant, and thus form it into a compact bush. This may be repeated two or three times with advantage in the earlier part of the season with the free flowering kinds; but after the plant is fairly formed it should be discontinued, otherwise the flowering will be injured."—*Gard. Chron.*

Cuttings.—The same authority says, that "the proper time for striking cuttings depends upon the objects which the propagator has in view. Nurserymen who want a good stock of a particular kind may propagate it at almost

any season, and generally begin very early in spring. But, for ordinary purposes, from the middle of March to the middle of April is quite soon enough; and the amateur can then do so without any artificial heat, which is of great consequence to those who have very limited gardens.

"It matters very little whether the cuttings are taken off with roots or without them, as in the latter case they will form them in a few days, and soon begin to grow rapidly. The frame should be kept very close, moist, and shaded, until the cuttings have formed roots for their support; when this takes place, a little air may be admitted gradually as the plants will bear it, and then afterwards they must be fully exposed."—*Gard. Chron.*

After-Culture.—"After the flowering season is past, and the old stems cut down, the plants should be removed from the green-house or conservatory, and placed in a cold frame, where they are merely protected from severe frost. Here they should have plenty of air, and on fine days the lights should be drawn quite off, and the plants fully exposed. When the winter is mild, they will stand very well unprotected; but owing to their having been grown and excited in the green-house, they are more apt to suffer from severe weather than if they had been planted out in the open air. For this reason it is always better to have the means of giving them some slight protection. If they are kept too close and warm in winter, they begin to grow fast: the leaves are yellow, and the stems weak, and consequently they form bad cuttings when the season of propagation comes round. But if they are merely protected and attended to, as has been already described, they grow slowly, and make excellent cuttings. Those who wish to make very large specimens of these plants with little trouble, sometimes plant them out in a rich border in April or May, as soon as the cuttings are rooted. Here they grow with great luxuriance, and are very large and bushy, when the time comes for taking them up, and removing them into the green-house. In autumn, they are taken up very carefully, and placed in a shaded situation for a few days, until they recover from the effects of the operation, and are then taken to the green-house.

There is another plan for making small dwarf flowering specimens, which deserves especial notice. The young shoots which have grown to a considerable length, have their points 'layered' about the month of August, in small pots. As soon as they are well rooted, they are cut from the parent stock, repotted, and placed for a short time in a shaded place until they recover. They are then subjected to the same treatment as the others, and generally flower on stems about a foot or eighteen inches in height."—*Gard. Chron.* Give liquid guano twice a week so soon as the flower buds are well formed.

Seed should be saved, and crosses effected, from semi-double flowers.

Mildew.—"At the end of summer chrysanthemums are extremely liable to be infected with mildew. Those plants upon which it makes its appearance, should be immediately separated from the rest, and well dusted with flowers of sulphur. This should be allowed to remain on them at least a day or two, and may afterwards be washed off with a syringe or garden engine."—*Gard. Chron.* A very weak solution of common salt syringed repeatedly over the leaves, and, after remaining a few hours, washed off by a syringing with pure water, would be equally effectual.

CHRYSEIS. Three species. Hardy tuberous-rooted perennials. Seeds. Rich soil.

CHRYSIPIHALA. Four species. Green-house bulbous perennials. Offsets. Light loam.

CHRYSOCOMA. Fourteen species. Hardy herbaceous perennials, and stove evergreen shrubs. Ripe cuttings. Loam and peat.

CHRYSOPHYLLUM. Six species, and some varieties. Stove evergreen trees. Ripe cuttings. Loam and peat.

CHRYSOSPENIUM. Three species. Hardy herbaceous perennials. Division. Moist soil.

CHRYSOSTEMMA tripteris. Hardy herbaceous perennial. Division. Peat and loam.

CHYSIS aurea. Stove epiphyte. Division. Wood.

CIBOTIUM Billardieri. Green-house evergreen tree fern. Division. Loam and peat.

CIBOLU, or WELSH ONION. *Allium fistulosum.* This is a perennial, never forming any bulb, but is sown

annually, to be drawn young for salads, &c. On account of its strong taste, it is greatly inferior to the common onion for this purpose; but from its extreme hardness in withstanding the severest frost, it may be cultivated with advantage as a winter-standing crop for spring use.

Varieties.—Two varieties are in cultivation, the white and the red; the first of which is in general use.

Cultivation.—As it may be sown at all times with the onion, and is similarly cultivated, except that it may be sown thicker, and only thinned as wanted, the direction given for that vegetable will suffice. The blade usually dies away completely in winter, but fresh ones are thrown out again in February or March.

To obtain Seed.—To obtain seed some of the roots must be planted out in March, six or eight inches asunder. The first autumn they will produce but little seed; in the second and third, however, it will be produced abundantly. If care is taken to part and transplant the roots every two or three years, they may be multiplied, and will remain productive for many years, and afford much better seed than that from one-year-old roots.

Scallions.—There is good reason for concluding that by a confusion of names, arising from similarity of appearance, this vegetable is the true scallion, whilst the hollow leek of Wales is the true Welsh onion; for the description of scallion, as given by Miller, accords exactly with that of the Welsh onion. At present all onions that have refused to bulb, and formed lengthened necks and strong blades in spring and summer, are called scallions.

CICCA disticha. Stove evergreen fruit tree. Leafy cuttings. Sandy loam.

CIMICIFUGA. Four species. Hardy herbaceous perennials. Division. Seeds. Common soil.

CINCHONA. Two species. Stove evergreen tree and shrub. Ripe cuttings. Loam and peat.

CINERARIA. Fifty-four species. Chiefly hardy and green-house herbaceous; but some green-house evergreen shrubs. It is a genus of florists' flowers, and the varieties which they have raised are very numerous. A good selection is the following:—

Eclipse; Gem; Nobilis; Perfecta; Queen Victoria; Rival King; Royal Blue; Sapphire; Splendida; Waterhousiana; and Webberiana.

Characteristics of Excellence.—The cineraria does not exhibit so much improvement as most florists' flowers.

“The petals should be thick, broad, blunt, and smooth at the ends, closely set, and form a circle without much indentation. The centre, or yellow disk, should be less than one-third of the diameter of the whole flower; in other words, the coloured circle formed by the petals should be wider all round than the disk measures across. The colour should be brilliant, whether shaded or self; or if it be a white it should be very pure.

“The trusses of flower should be large and close, and even on the surface, the individual flowers standing together with their edges touching each other, however numerous they may be. The plant should be dwarf. The stems strong, and not longer than the width across the foliage; in other words, from the upper surface of the truss of the flower to the leaves where the stem starts from should not be a greater distance than from one side of the foliage to the other.”—*Hort. Mag.*

Propagation by Seed.—“Sow in May in the open border; thin out the plants where they are crowded, and transplant them when they have three good leaves, and pot them to remain in October.”—*Gard. Chron.*

Propagation by Cuttings.—“After the bloom has perfected itself and decayed, cut down the stems, stir the earth upon the surface, then earth up with fresh compost, filling the pot rather full than otherwise; refresh the plants with a little water, and place them in the frame again; or if you have none convenient, in a dry and sheltered place in the garden.

“The growth of a few weeks will enable you to detect side shoots, some with roots, and some without roots, and leave only the main plant in the pot, which should be earthed up again, and set by. The shoots which have no roots to them should be stripped of two or three of the bottom leaves, that they may be placed in a pot of the usual sort of compost that the plant may have been growing in, with a little sand at top, say a quarter of an inch thick, and

covered with a bell glass; or if there be enough, they may be placed a dozen or two in a large pan, and a glass that will fit inside the rim, covered over them. They must never be allowed to dry. The glasses should be occasionally wiped dry inside. Whether there be one cutting or a dozen, they should be so placed that the glass can be pressed into the sand to keep out the air until they have all struck.

"They can always be watered without disturbing the glass, if it be properly placed inside the rim, because by watering over the glass, the whole can be soaked; but the drainage must be good, or they will rot.

"If you happen to have a declining hot-bed in which there remains a little bottom heat, the pan or pots may be placed therein. It will rather hasten the striking. Those side-shoots which have roots to them may be immediately potted into sixty-sized pots, and treated the same as seedlings just potted off. In a few weeks the cuttings will have struck, which will be indicated by their beginning to grow; they may be potted off also, as seedlings are potted, in sixty-sized pots. Here the treatment is just the same as that directed for seedlings."—*Hort. Mag.*

After-Culture.—"About the first week in June, the plants being removed from the green-house, and turned out of their pots, the old earth shaken from their roots, plant rather deeply, and about eighteen inches apart in light rich soil in the open garden, and water as often as they seem to require it. By the end of July, they throw up myriads of suckers; they are then taken up and parted, preserving the smallest atom that has a root to it. The largest plants are potted in pots proportionate to their size, in a compost consisting of leaf mould, rotten dung, and strong turfy loam, in about equal quantities, and placed in a shady situation. These will flower in September and October, and will do well either for the house, or for filling up beds, or vacancies in the flower garden. The other plants are replanted in the open garden, watered, and shaded until established, taken up with balls, and potted about the end of October, and protected from frost in a cold frame or pit through the winter. In this manner, and by keeping plants of various sizes, a regular

supply of flowers may be had from September to the end of June. Single plants in thirty-two or twenty-four-sized pots are large enough. No plants suffer so much from being crowded together; indeed, when short of room it is better to throw away a few plants than have the whole cramped for room."—*Gard. Chron.*

Winter-blooming.—"When the cinerarias have done flowering, cut off all the flower-stems and old leaves, and place them in a cold pit or frame, which must be kept rather close for two or three weeks to cause the plants to grow; afterwards admit air freely by day, but keep them close at night; then about the beginning of August divide the old plants into pieces, and put them into small pots filled with a mixture of good loam and sandy peat, to which may be added a small portion of well-rotted dung. When potted, return them to the pit or frame, and keep them close; afterwards, as they grow, shift them into larger pots, and use a little manure-water; and finally, as the danger of frost approaches, remove them to the green-house, where they will bloom well all the winter and spring, if kept free from insects."—*Gard. Chron.*

CINNAMOMUM. Cinnamon. Eleven species. Stove evergreen trees. Ripe cuttings. Loam and peat.

CINNAMON. *Cinnamomum*.

CION. See *Scion*.

CIRCÆA. Three species. Hardy herbaceous perennials. Offsets. Common soil.

CIRCUMPOSITION differs from layering, only that in this the shoot to be rooted is bent down to the soil, whilst in circumposition the soil is placed in a vessel and raised to the shoot. There are pots called *layering pots* made for this practice, and differing from the common garden pot, only by having a section about an inch broad cut through one side, and to the centre of the bottom, for the admission of the shoot or branch.

M. Foulup employs "small tin cases of a conical form, like the upper part of a funnel, two and three-quarter inches in length, and two and a sixth inches in width at top, narrowing towards the lower part till only sufficient room is left for the introduction of the shoot or branch intended to be propagated. These cones are supported on

rods, to which they are secured by wire. Commencing with the central branches, the leaves are taken from the parts which the tin is intended to inclose; the branch is cut two-thirds through as in layering, and being enclosed by the funnel, the latter is well packed with moss. Moisture necessary for favouring the emission of roots is supplied by means of a bottle, from which the bottom is struck off, and the neck furnished with a cork, perforated so as to admit a small pigeon's feather or bit of wool to form a syphon, by means of which the moss is kept in a proper state of moisture. Hard-wooded plants are propagated in this way from the middle of May till the end of June; and the branches are sufficiently rooted to be taken off by the end of September. It is, however, necessary in all cases, to ascertain whether the branches are sufficiently rooted previously to their being separated. This is easily done by opening up the edges of the tin; when the branches are found to be sufficiently rooted they are potted off without removing the moss by which the roots are surrounded. Being moderately watered, they are immediately placed under glass on a slight hot-bed, and kept shut up for a fortnight. They are then gradually exposed, and afterwards placed in the shade of large trees, so that only half the rays of the sun shall reach them."—*Gard. Chron.*

CIRRIÆA. Six species. Stove epiphytes. Division. Wood.

CIRROPETALUM. Seven species. Stove epiphytes. Division. Wood.

CIRSIUM. Eighty-six species. Hardy annuals, biennials, and herbaceous perennials. Seeds or division. Common soil.

CISSAMPELOS. Six species. Stove or green-house climbers. Cuttings. Sandy peat.

CISSUS. Seventeen species. Stove or green-house evergreen climbers. Cuttings. Light rich soil.

CISTERNS for the accumulation of rain-water should be formed in connection with the gutters of the various buildings in the gardens, for no water is equal to it for the artificial supply of moisture to plants.

CISTUS. Thirty-nine species and varieties. Hardy evergreen shrubs. Layers or ripened cuttings. Common soil.

CITHAREYULUM. Nine species. Stove evergreen trees. Cuttings. Peat and loam.

CITRON. *Citrus.*

CITRUS. Fourteen species. Green-house evergreen fruit trees or shrubs, budding or grafting, and sometimes cuttings. Rich loamy soil mixed with dung.

For the structure of a house suitable for their cultivation, see *Orangery*. The following extracts from an essay by Mr. Jones, gardener at Knowsley, exhibits the successful practice in cultivating this genus, pursued by Mr. Durden, gardener at Hurst House, Lancashire.

Varieties.—Those who wish to cultivate the orange tree for the sake of the fruit, ought to be very careful in making a selection of sorts, especially of sweet oranges.

The best way, perhaps, is to procure grafts or young plants from such varieties as have proved themselves to be good in other establishments, or proved plants from a nursery.

Soil.—Too much attention cannot be paid to the soil; its principal features ought to be lightness, richness, and openness of texture, and unless it possess these qualities it is unfit for the orange tribe.

Water.—This must at all times be sparingly administered, especially if the trees are kept in a high moist temperature. Occasionally give a little weak liquid manure.

Temperature.—It is doubtless an erroneous opinion, that if the atmospheric temperature is 8° to 10° above the freezing point during winter, and is never allowed to rise above 70° or 80° during summer, that the orange tribe, under other circumstances being favourable, may be cultivated successfully. Mr. Durden never allows the temperature of his house to fall below 50° during the winter season, and during summer retains a moist atmosphere of 80° or 90°.

After-Culture.—In pruning, if the plants are trained on trellises, the branches should be kept thin to allow the greater part of the leaves to be exposed to the sun. The fruit is generally produced at the tips of the small spurs or brackets; therefore it would be a positive injury to the crop to shorten any of these spurs, except it is desirable

to increase their number. The operation of pruning is performed at any time when it appears to be necessary, always, however, taking care to have a succession of young wood coming in. In thinning the fruit, particular attention ought to be paid to the state of the tree, for the quantity of fruit must be entirely regulated by the vigour of the tree; no better rule can be laid down than that for governing the operation of thinning.

If a tree appears debilitated in the extreme, it must not be allowed to carry any fruit for an entire season.

One cause of debility is, allowing the fruit to remain long after it is ripe. Of that required for confectionary purposes a larger quantity may be left on the trees, but it must always be proportioned to the capabilities of the tree.

Cleaning the Plants.—The greatest attention should be paid to cleanliness; the consequences of allowing insects to overrun a collection of plants are familiar to every one acquainted with gardening.

“The aphid attacks the tender shoots and young leaves; the red spider the more advanced foliage; and the *coccus hesperidum* every part of the plant.

“Almost every gardener has his peculiar nostrum for destroying these animals; but a good preventive is cleanliness in everything about the plants.

“The *coccus* may be brushed off, using a brush that is no harder than is just necessary to remove the insect.

“For the thrips red spider, and aphid, a sponge and clean water will remove them all, if used before the insects have become very numerous.

“Fumigation should never be resorted to except in extreme cases.

“The leaves should also be cleaned with a damp sponge as often as they appear clogged by dust adhering to the resinous exudations on their surface.”—(*Gard. Chron.*—*Gard. Almanack.*)

CLADANTHUS. Two species. Hardy annual and half hardy evergreen shrub. Seeds. Common soil.

CLARKIA. Three species and variety. Hardy annuals. Seeds. Common soil.

CLARY. (*Salvia sclarea.*) Its leaves are sometimes used in soups and medicated wines. A very small number of plants are sufficient for a family. Sow early in April, or a month earlier in any light-soiled border. Thin the

plants to two feet apart. The sowing must be annual. *Seed* may be saved by allowing some plants to run up the next spring; they ripen their seed in September.

CLAUSEN *Apentaphylla*. Stove evergreen tree. Cuttings. Rich loam.

CLAVIJA. Two species. Stove evergreen shrubs. Cuttings. Peat and loam.

CLAY is a constituent of all fertile soils, though in these it rarely exceeds one-sixteenth part, and generally bears a much smaller relative proportion to the other constituents. In its pure state it is known as alumina. It is the best of all additions to light, unretentive soils, for it retains moisture much more powerfully than any other earth. M. Schubler found, that when silicious sand lost eighty-eight parts of moisture, and chalky sand seventy-six, stiff clay in the same time lost only thirty-five parts. When clay has to be conveyed in large quantities, and to a distance, it should be dug and laid exposed in rough spits to the air for several days before it is carted, and, indeed, so should all earths; for, as Mr. Cuthbert Johnson states in his valuable *Farmer's Encyclopædia*, if one hundred cubic yards of chalk, clay, or marl have to be moved, by drying previously they will lose in weight as follows:—

Chalk	. . .	20 to 24 tons.
Clay	. . .	32 “ 42 “
Marl	. . .	18 “ 26 “

For the improvement of clay lands, by rendering their staple less retentive, burning some of their own soil is an efficient application. One hundred tons per acre for this purpose are not too many; for a dressing as a manure, thirty tons are a good quantity. The following is the mode of burning clay.

“Let sods be cut of a convenient size to handle, say a foot wide and eighteen inches in length; with these form a parallelogram or long square; let the walls be a couple of feet thick, and trampled or beaten firmly together, and raised at least three feet high; the first heap should be so situated, that the wind may blow against one of its sides; it may be from four to six yards long, by three yards wide, and an aperture within one yard of each end, and others at a distance of about five feet from these should be left in the side walls, when building, for the purpose of form-

ing drain-like openings across the heap; make one of these drain-like openings from end to end in length; these funnels are to be built also with sods; some dry turf, such as is used for fuel, is to be put into these funnels and over it, and between the funnels well-dried sods or any other combustible materials are to be laid on to the depth of a couple of feet over these sods, partially dried to the level of the walls; these materials being set on fire, a powerful heat will be produced, quite capable of burning clay, without previously drying it. Care, however, will be necessary to avoid throwing it on in too great a quantity at once, until the fire is well up, when a large quantity may be thrown on. The sod walls are to be raised as the heap rises; and as soon as it is perceived by the strength of the smoke and glow of heat, that the mass is ignited in all its parts, the apertures may be closed up, and the heap left to become charred; should appearances indicate a likelihood of the fire being smothered, it will only become necessary to open one or more of the funnels to secure its acting. If the land on which the burned or charred clay is to be applied be deficient in calcareous matter, earth containing it, if burned, would improve it much. If well done, there is no improvement so cheap, and at the same time so valuable; if, on the other hand, the burning is hurried, or the fires neglected, the consequence will be, either the clay will be burned into lumps like brick ends that will not fall to pieces when exposed to the air, or the clay will not be charred or burned at all; therefore, the heat should always be slow and steady, never, if possible, burning the clay red, but black. This is difficult to manage, depending much upon the wind, stopping up the aperture upon the windward side, and opening that on the other side. The whole time the heaps are burning will take from two to three months, the time depending much on the weather; from sixty to one hundred yards may be burned in a heap; and if there be not sufficient sod, coarse turf, bushes, &c., on the spot to keep up a sufficient body of fire at the commencement, wood of any kind, or small coal, must be used."

—*Gard. Chron.*

Clay soils are the worst that can be for gardens, for there is scarcely one of

the crops there cultivated that is not injured by stagnant water, which can scarcely be prevented in clay soils at some seasons; and in wet weather clayey soils cannot be worked, whereas the gardener must be inserting or attending to his crops every day.

CLAYTONIA. Fifteen species. Hardy annuals or tuberous-rooted perennials. Seeds. Peat soil.

CLEMATIS. Fifty species, and many varieties, chiefly climbers. The stove and green-house species grow well in a light loam and peat soil, and increase from cuttings. The hardy herbaceous kinds, divisions. The hardy deciduous, layers. Common soil.

CLEOME. Twenty species. Stove or hardy annuals, biennials, or evergreen shrubs. Cuttings or seeds. Rich light soil.

CLEONIA *lusitanica*. Hardy annual. Seeds. Common soil.

CLERODENDRUM. Forty species. Chiefly stove evergreen shrubs. *C. volubile*, a climber. Cuttings. A rich soil of loam, rotten dung, and sandy peat.

CLETHRA. Nine species. Hardy deciduous or stove green-house evergreen shrubs. Cuttings. Peat earth, or light sandy loam. The hardy kinds increase also by layers.

CLEYERA *japonica*. Green-house evergreen shrub. Cuttings. Sandy peat.

CLIANTHUS *puniceus*. Half hardy evergreen shrub. Cuttings. Loam, peat, and sand.

CLICK-BEETLE. See *Wireworm*.

CLIDEMIA. Twelve species. Stove evergreen shrubs. Cuttings. Peat and loam.

CLIFFORTIA. Sixteen species. Green-house evergreen shrubs. Cuttings of the young wood. Peat and loam.

CLIMATE controls the growth of plants most imperatively, and in the cultivation of his fruits, flowers, and culinary vegetables, it forms the first object of the gardener's inquiry. He must first know the climate in which any given plant is native; and secondly, the soil which it affects, before he can cultivate it successfully. How all-influential is climate appears from the fact, that different countries have often a totally different Flora on soils similar in constitution. Thus, as is observed

by Decandolle and Sprengel, in *The Philosophy of Plants*, "there are a great many perfect plants which exclusively belong to the tropics, which never pass beyond them, and which are found equally in Asia and Africa, in America and the South Sea Islands, and even in New Holland. Although, as we have said, these are rather families, as Palmæ Scitamineæ, Museæ, Sapindæ, and Anonæ; or genera, as Epidendrum, Santalum, Olax, Cymbidium, and so forth; yet there are particular species, which grow in all parts of the world only between the tropics, as for instance, *Heliotropium Indicum*, *Ageratum conyzoides*, *Pistia stratiotes*, *Scoparia dulcis*, *Guilandina Bonduc*, *Sphenoclea zeylanica*, *Abrus precatorius*, *Boerhavia mutabilis*, and so forth. But most commonly there are other species, which, under the same degree of latitude, supply in the new world the place of related species in the old. *Dryas octopetala*, indeed, grows equally upon the mountains of Canada, and in Europe; but *Dryas tenella* of Pursh, which is very like the former, grows only in Greenland and Labrador. Instead of the *Platanus Orientalis*, there grows in North America the *Platanus Occidentalis*; instead of *Pinus Cembra*, in Europe and Asia, there grows in North America *Pinus Strobus*; instead of *Prunus Laurocerasus*, in Asia Minor, there grows under the same latitude in North America the *Prunus Caroliniana*. There are many exceptions to this rule, however, depending on circumstances that have been already noticed. In the first place, countries are wont to share their Floras with neighbouring regions, especially islands lying under the same latitude, as the Azores possess the Floras of Europe and of Northern Africa, rather than those of America, because they are scarcely ten degrees of longitude from the coast of Portugal. Sicily, and, still more, Malta, possesses a Flora made up of those of the South of Europe and the North of Africa. The Aleutian Islands share their Flora with the north-west coast of America, and the north-east of Asia. But the most distant countries, lying under the same latitude, may have the same or a similar vegetation, while countries or islands which lie between them, have not the least share in this particular Flora. The island of St. Helena, which is

scarcely eighteen degrees of longitude from the west of Africa, and which lies a little further south than Congo, has yet no plants, which are found in those last-named regions. (Roxburgh's List of Plants seen in the Island of St. Helena, appended to Beatson's Island of St. Helena.) Japan has a great many plants common to Southern Europe, which, however, are not found in those regions of Asia that lie under the same latitude.

We must further remark, that the eastern countries of the old world, and the eastern shores of America, as far as the Alleghany Mountains, have a much lower temperature than the western regions; and that it is always colder in Siberia and the north-east of Asia, than under the same latitude in Europe; and, that even Petersburg is colder than Upsal, and Upsal than Christiania; although they all three lie in the sixtieth degree of north latitude. In North America the difference is still greater, and there are commonly fifteen degrees of Fahrenheit's thermometer between the temperature of the east and west coast. It hence happens that many plants which in Norway grow under the polar circle, scarcely reach the sixtieth degree, on the limits between Asia and Europe. To this class belong the Silver Fir, Mountain Ash, Trembling Poplar, Black Alder, and Juniper. Even in the temperate zone, the vegetation of many trees ceases sooner in the east than in the west. In Lithuania and Prussia, under the fifty-third degree, neither vines nor peaches nor apricots thrive: at least their fruit does not ripen, as also happens in the middle of England. The most remarkable example of this great difference of temperature is furnished by the *Mespilus Japonica*, which grows at Nanga Sacki, and Jeddo, under the thirty-third and thirty-sixth degrees of north latitude; and which also grows in the open air in England, under the fifty-second degree of north latitude, when it is planted against a wall.—*Botanical Register*, Vol. V.

The same degree of latitude in the southern and northern hemisphere, are connected with very different temperatures, and produce a completely different vegetation. This, however, must be understood rather of the temperate and frigid zones, than of the tropical

climates, which, as we have already noticed, are pretty much the same over the whole earth. But the summer is shorter in the southern hemisphere, because the motion of the earth in her perigee is more rapid. The summer is there also colder, because the greater quantity of ice over the vast extent of sea requires more heat for dissolving it than can be obtained; as also because the sunbeams are not reflected in such quantity from the clear surface of the sea water, as to afford the proper degree of heat. It thence happens that in the southern hemisphere the Flora of the pole extends nearer the equator, than in the northern. Under the 53d and 54th degrees of latitude, we meet with plants which correspond with the Arctic Flora. In Magellan's Land, and in Terra del Fuego, *Betula antarctica* corresponds with *Betula nana* in Lapland; *Empetrum rubrum* with *Empetrum nigrum*—*Arnica oporina* with *Arnica montana*—*Genm Magellanica* with *Genm rivale* in England—*Saxifraga Magellanica* with *Saxifraga rivularis* in Finmark. Instead of *Andromeda tetragona* and *hypnoides* of Lapland, Terra del Fuego produces *Andromeda myrsinites*; in place of *Arbutus alpina* and *Uva ursi* of the Arctic polar circle, Terra del Fuego produces *Arbutus mucronata*, *microphylla*, and *pumila*. *Aria antarctica* reminds us of the *Holcus alpina* of Wahlenburgh; and *Pinguicula antarctica* recalls to our recollection *Pinguicula alpina*. We must recollect, however, that in South America the great mountain chains of the Andes stretch from the tropical regions, almost without interruption, to the Straits of Magellan (from the 52d to the 53d degree of S. lat.), and that, on this account, tropical forms are seen in that frigid southern zone, because the tract of mountains everywhere determines vegetation. It is hence that the straits of Magellan are prolific of *Coronariæ*, *Onagræ*, *Dorsteniæ*, and *Heliotropiæ*, which in other parts of the world grow only within the tropics, or in their neighbourhood. In general the vegetation of the southern hemisphere is very different from that of the northern; and there is a certain correspondence between the Floras of Southern Africa, America, and New Holland. Most of the trees are woody with stiff leaves, blossoms sometimes magnificent, but

fruit of little flavour. In Southern Africa, as well as in New Holland, it is the form of the *Protææ* which prevails, as if appropriated to these regions. Instead of the South American *Ericæ*, we find the *Epacridæ* of New Holland; *Lo-beliæ*, *Diosmæ*, and a great number of rare forms of compound blossoms and of *umbellatæ*, are common to all these southern regions."

Now, the reason for these differences is, that the countries thus contrasted differ in climate—that is, they differ in the intensity and duration of light and heat they enjoy—they differ in the contrast of their day and night temperatures—they differ in the relative length of the day and night—they differ in the length of their summer and winter, or, which is synonymous, in the relative length of their periods of vegetable activity and rest—they differ also in the amount of rain which falls, not only annually, but at particular seasons—they differ in having much atmospheric moisture deposited in the form of rain or dew, or snow, at different periods of vegetable activity or rest. Now, whatever these differences are, whatever the peculiarities of a climate are from which a plant comes, the gardener cannot cultivate it successfully unless he secures to that plant those climatal differences and peculiarities.

CLIMBERS are plants which attach themselves to supporters by their natural appendages, as either by their tendrils or by their hooks.

CLINOPODIUM. Three species. Hardy herbaceous perennials. Division or seeds. Common soil.

CLINTONIA. Two species. Annuals. *C. elegans* may be sown where it is to remain in the open borders, but *C. pulchella* requires its seedlings to be raised in a green-house or under a frame.—"If it is sown as soon as the seed is ripe, in two-thirds leaf mould, and one-third common soil, with a little sand, care being taken to make the soil firm enough to prevent the seed from being dislodged in watering; where it is intended to have beds of it in the flower garden, it may be planted out in the beginning of March: none of the frosts that happen after that time will injure it.

"If the seedlings were planted out in the autumn, early enough to take root in the soil before the winter, there

is no doubt they would prove as hardy as any of the Californian annuals, and, like them, succeed better in that way, than if sown or planted out in the spring."—*Gard. Chron.*

CLIPPING hedges should be confined to those of the commonest and hardiest varieties of shrubs, as those of hawthorn and privet. The shears may, however, be used with great advantage by expert operators, even on the most delicate plants used for ornamental hedges. Clipping of deciduous hedges is most advantageously performed in the spring and early summer. A multitude of shoots are then induced, which secures that chief desideratum in hedges—thickness and closeness of texture.

CLISIOCAMPA *neustria*, the Lacky Moth, flies only at night. It appears about July, and its eggs are laid round the twigs of trees in the form of a broad band of about three hundred eggs, closely glued together, and resembling a ring of seed lac. The caterpillars striped longitudinally blue, red, and yellow, appear from these in the April or May following. They congregate in large nests at the forks of the small branches, and are then easily crushed *en masse*. They enter the chrysalis state at the end of June, and then they are to be found in cocoons between two leaves, &c.

"In June they are full grown and about an inch in length, gray striped with blue, red, and yellow, and having but few hairs. The caterpillar spins between two leaves a thin web of an oval form, and it becomes a longish brown pupa, in which state it remains for three weeks or a month. In July the moth appears, which in size and colour, is not unlike the silkworm moth. Its colour is light yellow, and sometimes dark olive colour. The upper wings are banded, and the lower wings are generally of a uniform brownish colour. The male is readily known from the female, by its strongly pectinated antennæ and thinner body. The insect flies only at night, and consequently is rarely seen. It often appears in considerable numbers, and does not confine its ravages to fruit trees, but attacks many other trees; such as beeches, elms, poplars, oaks, and even pines. The best means of lessening the devastations committed by the insect is, in the winter season, carefully to

search the fruit trees for the bands of eggs laid on the branches, and to crush them. In May, when the caterpillars are living in society, the nests containing them should be collected and destroyed. Care must be taken when collecting the nests, for if the caterpillars are much disturbed, they let themselves down to the ground by means of a thin silken thread, and escape. In July their cocoons should be looked for on the trees between the leaves, in the roofs of sheds, and even on the tops of walls."—*Gard. Chron.*

CLITORIA. Thirteen species. Chiefly stove or green-house evergreen climbers. *C. mariana* is a half hardy deciduous. Cuttings, seeds. Loam, peat, and sand.

CLIVIA *nobilis*. Green-house evergreen bulbous plant. Division, seeds. Rich sandy loam.

CLOUDBERRY. *Rubus chamaemorus*.

CLOVE. *Dianthus caryophyllus*.

CLOVER TREE. *Caryophyllus*.

CLOWESIA *rosea*. Stove shrub. Cuttings. Rich loam.

CLUB ROOT. See *Ambury*.

CLUMPS when close are sometimes called *Thickets*, and when open *Groups of Trees*. They differ only in extent from a wood, if they are close, or from a grove, if they are open; they are small woods, and small groves, governed by the same principles as the larger, after allowances made for their dimensions. But besides the properties they may have in common with woods, or with groves, they have others peculiar to themselves. They are either independent or relative; when independent, their beauty as single objects is solely to be attended to; when relative, the beauty of the individuals must be sacrificed to the effect of the whole, which is the greater consideration. The least clump that can be, is of two trees; and the best effect they can have, is, that their heads united should appear one large tree; two, therefore, of different species, or seven or eight of such shapes as do not easily join, can hardly be a beautiful group, especially if it have a tendency to a circular form. Such clumps of firs, though very common, are seldom pleasing; they do not compose one mass, but are only a confused number of pinnacles. The confusion is, however, avoided by placing them in succession, not in clusters; and a

clump of such trees is therefore more agreeable when it is extended rather in length than in breadth.

Three trees together must form either a right line or a triangle; to disguise the regularity, the distances should be very different. Distinctions in their shapes contribute also to the same end; and variety in their growths still more. When a straight line consists of two trees nearly similar, and of a third much lower than they are, the even direction in which they stand is hardly discernible.

If humbler growths at the extremity can discompose the strictest regularity, the use of it is thereby recommended upon other occasions. It is, indeed, the variety peculiarly proper for clumps: every apparent artifice affecting the objects of nature, disgusts; and clumps are such distinguished objects, so liable to the suspicion of having been left or placed on purpose to be so distinguished, that, to divert the attention from these symptoms of art, irregularity in the composition is more important to them, than to a wood or to a grove. Being also less extensive, they do not admit so much variety of outline; but variety of growths is most observable in a small compass, and the several gradations may often be cast into beautiful figures.

The extent and the outline of a wood or a grove, engage the attention more than the extremities; but in clumps these last are of the most consequence; they determine the form of the whole, and both of them are generally in sight: great care should therefore be taken to make them agreeable and different. The ease with which they may be compared, forbids all similarity between them; for every appearance of equality suggests an idea of art, and therefore a clump as broad as it is long, seems less the work of nature than one which stretches into length.

Another peculiarity of clumps is the facility with which they admit a mixture of trees and of shrubs, of wood and of grove; in short, of every species of plantation. None are more beautiful than those which are so composed. Such compositions are, however, more proper in compact than in straggling clumps; they are most agreeable when they form one mass. If the transitions from very lofty to very humble growths, from

thicket to open plantations, be frequent and sudden, the disorder is more suited to rude than to elegant scenes.

The occasions on which independent clumps may be applied are many. They are often desirable as beautiful objects in themselves; they are sometimes necessary to break an extent of lawn, or a continued line, whether of ground or of plantation; but on all occasions, a jealousy of art constantly attends them, which irregularity in their figure will not always alone remove. Though elevations show them to advantage, yet a hillock evidently thrown up on purpose to be crowned with a clump, is artificial to a degree of disgust; some of the trees should therefore be planted on the sides to take off that appearance. The same expedient may be applied to clumps placed on the brow of a hill, to interrupt its sameness; they will have less ostentation of design if they are in part carried down either declivity.

A line of clumps, if the intervals be closed by others beyond them, has the appearance of a wood, or of a grove; and in one respect the semblance has an advantage over the reality in different points of view; the relations between the clumps are changed, and a variety of forms is produced, which no continued wood or grove, however broken, can furnish. These forms cannot all be equally agreeable, and too anxious a solicitude to make them everywhere pleasing, may, perhaps, prevent their being ever beautiful.

The effect must often be left to chance, but it should be studiously consulted from a few principal points of view; and it is easy to make any recess, any prominence, any figure in the outline, by clumps thus advancing before, or retiring behind one another."—*Whateley*.

CLUSIA. Four species. Stove evergreen trees. Cuttings. Light sandy loam.

CLUYTIA. Twelve species. Greenhouse or stove evergreen shrubs. Cuttings. Loam and peat.

CLYPEOLA. Two species. Hardy annuals. Seeds. Common soil.

CNEORUM. Two species. Greenhouse evergreen shrubs. Cuttings. Peat and loam.

CNESTIS. Three species. Stove

evergreen shrubs. Cuttings. Sandy peat.

COAL. See *Fuel*.

COAL ASHES. See *Ashes*.

COBCEA *scandens*. Half hardy evergreen climber. Seeds or cuttings. Peat and loam.

COBURGHIA. Three species. Greenhouse and half hardy bulbous perennials. Division. Peat and loam.

COCCINELLÆ. Lady Birds. There are about thirty species of this useful and beautiful insect. Let no one destroy a coccinella, for it is the greatest destroyer of the plant louse or aphid. This is much better appreciated on the continent than in England, for there the gardeners collect lady birds and place them upon rose trees, &c., infected with aphides.

COCCOLOBA. Nineteen species. Stove evergreen trees. Leafy ripened cuttings. Loam and peat.

COCCUS. Scale Insect. The species of this family are most usually, but not exclusively, found upon the tenants of our green-houses and hot-houses. The males are active, but the females usually fixed to a part of the plant; the former having wings, and are so small as to require a magnifier to distinguish them distinctly: they then appear somewhat like a gnat in form. The females are much larger, and in shape not unlike a bed-bug, but with a scaly skin. When hatching they envelop themselves in a woolly case. The eggs are oval, but no larger than dots. Brushing the stems and branches of trees and shrubs with a hand scrubbing-brush, will destroy many of these vermin, and if spirit of turpentine, with a painter's brush, is applied, so as to visit every cranny of the bark, the application is perfectly effectual. Smaller and more delicate plants in pots, may be placed under a sea-kale or other pot, with a little of the spirit in a saucer, and then submitted to a gentle heat; the vapour of the turpentine will destroy the insect in an hour or two. If the first application fails, the second will not fail. The efficacy of a solution of soft soap in thinning the ranks of this pest, arises probably from the turpentine it contains.

"*C. hesperidum* is found in green-houses, especially on orange trees. It infests leaves as well as stems.

"*C. bromelia*. Pine Apple Scale in-

fects that fruit, the *hibiscus*, *justitia*, &c.

"*C. adonidum*. Mealy Bug. This feeds on tropical plants, with which it has been introduced into our hot-houses, especially *Coffee*, *Cestrum*, *Justicia*, *Canna*, *Musa*, *Renalmia*, &c.; but it also is very injurious to the vine and pine-apple.

"*C. testubo*. Turtle Scale. This is found chiefly on stove plants requiring a high temperature. The scale is oval, very convex, and dark brown."—*Gard. Chron.*

C. Vitis. Vine Scale preys upon the Grape Vine, both in the open air, and under glass. It seems to be the same species which also attacks occasionally the Peach, Nectarine, and Plum. It is, says Mr. Curtis, "a longish brown insect, which in old age assumes a blackish-brown colour, and becomes hemispherical and wrinkled. The females are shield-like; being convex above, and flat or concave below; they are furnished with six small legs, which, when the insect is old, become part of the substance of the body. On the under side of the insect is a sucker, with which it pierces the cuticle of the plants, and extracts their juices. Soon after impregnation the female dies, and her body becomes a protection for the eggs, which are covered with long white wool, and sometimes completely envelop the shoots of the vines, or of plants, growing underneath them. The males are furnished with four wings, and are apterous. Their powers of propagation are immense; and, where they once become very numerous, they are exceedingly difficult to eradicate."

As a genus of insects closely allied to the *Coccus*, and usually confounded with it, is *Aspidiotus*; and as all remedial observations applicable to the one are equally applicable to the other, the prevailing kinds are here enumerated.

"*A. nerii*. Oleander Scale is found in our stoves and green-houses, chiefly on the *Oleanders*, *Palma*, *Aloes* and *Acacias*.

"*A. rosa*. Rose Scale; *A. echinocacti*. Cactus Scale; *A. lauri*. Sweet Bay Scale; infest chiefly the plants by the names of which they are distinguished.

"*A. ostreaformis*. Pear Tree Oyster Scale, is found upon the pear tree.

Scale is much more difficult to destroy

than aphid ; as tobacco, soft soap, vinegar, and other materials scarcely affect them, even when applied in quantity and strength sufficiently to kill plants.

The most effectual method of ridding plants of these pests, besides those first named, is to brush or sponge the stems and leaves. If plants in pots are infested with this or any other kind of scale, they should never be cleansed in or near the house in which they are grown ; as, though the old ones have not always the power of locomotion, yet the young ones have. Shreds and matting which support plants in houses, should always be carefully examined, as they form a kind of nest for the young insects. Old shreds should never be used, without being previously boiled."—*Gard. Chron.*

COCHLEARIA. Eight species and some varieties. Chiefly hardy annuals or biennials. *C. armoracia*, the common horse-radish. Slips from the root. Deep rich soil. The annuals and biennials from seeds. Common soil.

COCKCHAFER. See *Melolontha*.

COCKSCOMB. *Rhinanthus Christa-galli*.

COCKSCOMB. *Erythrina Christa-galli*.

COCKSCOMB. *Celosia cristata*.—Sow the seed in a hot-bed, early in the spring, and transplant when danger from frost has passed : seed may also be sown later in the season, on an open border. To have Cockscombs in perfection requires highly manured soil, (it cannot be too rich,) and a careful pruning of lateral or side shoots—but one head or flower should be borne by each plant.

During dry weather water with a solution of manure or plain water, having first covered the earth around the plants with decomposed stable-dung.

COCOA-NUT TREE. *Cocos*.

COCOA PLUM. *Chrysobalanus*.

COCOS. Three species. Palms. Loam and peat, or light sandy loam in a warm moist atmosphere.

CODARIUM. Wild Tamarind. Two species. Stove evergreen tree and shrubs. Cuttings. Loam and peat.

CODONOPHORA. Stove evergreen shrubs. Cuttings. Peat and loam.

COELOGYNE. Seventeen species. Stove orchids. Division. Wood. They require a hot damp heat.

COFFEA. The Coffee Tree. Two

species. Stove evergreen shrubs. Ripened cuttings. Peat and loam.

COFFEE TREE. *Coffea*.

COGWOOD TREE. See *Laurus Cloroxylon*.

COKE. See *Fuel*.

COLBERTIA. Two species. Stove evergreen trees. Cuttings. Peat and loam.

COLBROOKIA. Two species. Green-house evergreen shrubs. Cuttings. Peat and loam.

COLCHICUM. Ten species and some varieties. Hardy bulbous perennials. Seeds or offsets. Light loamy soil.

COLDENIA procumbens. Stove annual trailer. Seeds. Common soil.

COLEONEMA alba. Green-house evergreen shrub. Cuttings. Peat and loam.

COLEWORT. See *Cabbage*.

COLLIFFLOWER. See *Cauliflower*.

COLLIGUAJA odorifera. Green-house evergreen shrub.

COLLINSIA. Five species. Hardy annuals. Seeds. Common soil.

COLLINSONIA. Five species and some varieties. Chiefly hardy herbaceous perennials. Division. Common moist garden soil.

COLLOGANIA. Two species. Stove evergreen climbers. Cuttings. Peat and loam.

COLOPHONIA mauritiana. Stove evergreen tree. Cuttings. Loam and peat.

COLUMBINE. *Aquilegia*.

COLUNARREA. Six species. Stove evergreen shrubs. *C. scandens* is a climber. Cuttings. Loam and peat.

COLURIA potentilloides. Hardy herbaceous perennial. Division. Peat and loam.

COLUTEA. Five species. Hardy deciduous shrubs. Seeds or cuttings. Common soil.

COLVILLEA racemosa. Stove evergreen tree.

COMARASTAPHYLIS arbutoides. Half hardy shrub. Cuttings. Sandy loam.

COMAROPSIS. Two species. Hardy herbaceous perennials. Seeds or division. Rich light loamy soil.

COMARUM palustre. Hardy herbaceous perennial. Division. Moist soil.

COMBRETUM. Seven species. Stove evergreen climbers or shrubs. Cuttings. Loam and peat.

COMESPERMA. Three species. Green-house evergreen shrubs. *C. gracilis* is a twining plant. Cuttings. Sandy loam and peat.

COMFREY. *Simphytum.*

COMMELINA. Twenty-five species. Chiefly stove evergreen trailers, which are increased by divisions and seeds: sandy loam and peat. The hardy kinds, seeds or offsets; and the annuals, seeds and common garden soil.

C. caelestris is one of the most beautiful of this genus, and the following directions for its cultivation are given by Mr. G. Gordon, of the Chiswick Gardens.

"About the end of February sow the seeds, in pans or pots, filled with a mixture of sandy loam and leaf mould, and place them in a warm pit, or dung-frame. When the young plants are large enough to handle, pot them off singly into sixty-sized pots, and return them to the warm frame, or pit, for a week or ten days; afterwards admit air, and finally remove them to a cold frame, or pit, to harden, ready for planting out in the open border, which should be done about the end of May, or beginning of June, when the danger from late frosts and cold nights is over.

"In planting, they must not be put in a dry or shaded situation, but in a warm, and rather damp one; and in a rich loamy soil. They will then flower freely all the summer and autumn; but like the Dahlia, their beauty is destroyed by the first frost in the autumn.

"The plants flower freely the first season from seed, but they display their delicate azure blossoms in the greatest perfection the second season, if the roots are taken up, and preserved like those of the Dahlia, over the winter, which is best done in the following way:—When the plants have done flowering, and there is danger of the roots getting injured by severe frost, they must be taken up, and placed to dry for a few days; then procure a box, or some large flower-pots, and place a little dry soil at the bottom; (the best substance for packing all kinds of roots in during winter, is dry sandy peat)—then place a layer of roots, filling in between with soil; and so on until you have disposed of all the roots, when the whole should be covered over with a thick layer of any dry substance. Place the plants either under the stage in the green-house, or

in a dry cellar for the winter, out of the reach of damp or frost; they will then require no more trouble until the following March, when they should be taken out, potted, and placed either in a warm pit or dung frame, to forward them again for planting out.

"The roots will survive the winter in the open border, if slightly protected, and kept dry; but then they are late in starting, and never so fine as when the roots are taken up, and preserved through the winter, like those of the Dahlia. The old roots may be divided like those of the Garden Ranunculus."

—*Gard. Chron.*

COMMERSONIA. Two species. Stove evergreen shrubs. Ripened cuttings. Peat and loam.

COMOCLADIA. Three species. Stove evergreen trees. Ripened cuttings. Peat and loam, or any light rich soil.

COMPARETTIA. Three species. Stove epiphytes. Division. Wood or fibrous peat.

COMPOST is a mixture of manures, or of earths and manures, in such proportions, and of such qualities as are considered particularly applicable to the plant or crops to which the composition is to be applied. The subject of Composts has been studied but slightly at present, by men who combine science with practice, and what is here offered, must consequently be less satisfactory than the author is conscious it might be.

A correct preparation of Composts must be founded upon a due knowledge of the food of plants. This is ascertainable from their analyses, and these reveal what is sustained by practice, that there are some substances required by all plants as food, and that there are other substances which are beneficial to some plants, and useless, or even injurious to others.

Now the substances universally required by cultivated plants, are, carbon, hydrogen, oxygen, nitrogen, and phosphate of lime, and, perhaps, common salt. These are supplied to plants by the atmosphere, and by decaying animal and vegetable matters.

The substances required only by particular plants, are certain salts, such as sulphate of lime, by the turnip;—sulphate of magnesia, (Epsom salt) by the potato;—nitrate of potass (saltpetre), by borage, and the lilac.

The food of plants, whether imbibed by their roots or their leaves, must be either in a liquid, or a gaseous form. In these states, most plants obtain a large portion of their food from the atmosphere, decomposing its carbonic acid, and water, and retaining only so much of their carbon, hydrogen, and oxygen, as they require. From the same source also they obtain nitrogen. But they do not obtain these from the atmosphere alone. The roots also obtain them from the soil. Animal and vegetable matters, as they decay, give out carbonic acid; and partly decompose into mucilage, soluble in water, both of which are rapidly imbibed by the roots. Composts, therefore, should contain these decomposing matters in such proportion, as to give the plants, to which they are applied, the vigour required. If leaves are required to be largely developed, the compost can be scarcely too rich; for the greater the quantity of food imbibed by the roots, the greater will be the surface of leaves requisite for its elaboration. But if flowers and fruit, as well as leaves, are desired, the composts, if excessively rich, will cause these to diminish in number and size, the flower-buds passing into leaf-buds for the reason already alleged.

Composts must also duly regulate the amount of moisture supplied to the roots, totally independent of drainage, as compost retains to them moisture by its chemical and capillary powers. The richer in decomposing animal and vegetable matter,—the richer in alumina, (clay),—and the looser its texture, the better does a compost retain water. And this power is diminished in proportion as siliceous sand, or calcareous (chalky) matters preponderate.

Mr. Errington, (*Gardener's Chronicle*, 1845,) prepares his composts from strong tenacious loam; half-rotten leaf-mould; heath-soil; horse-manure; cow-manure; charcoal and wood ashes; bone-dust; sharp sand; burnt turf; and moss well scalded; and, from these materials there is no doubt that a compost could be prepared, embracing any desired degree of fertility.—See *Manures and Potting*.

COMPOST-GROUND. This should be an enclosure, concealed from sight, but in the vicinity of the hot-beds, hot-houses, and other similar structures, for

the convenience of moving the pots to it, in the potting season; conveyance of manures, &c. All the earths and manures should be under a shed, and the dung, being liable to lose much of their fertile components in drainage, should be in water-tight tanks; and if these are covered all the better.

COMPTONIA asplenifolia. Hardy deciduous shrub. Layers. Sandy loam or peat.

CONANTHERA. Two species. Green-house bulbous perennials. Offsets. Light sandy loam.

CONIFERÆ or cone-bearing trees and shrubs are numerous, embracing the Pines, Larches, Firs, Cedars, Junipers, and Thuyas.

COMMON HARDY SPECIES.

Juniperus virginiana.

Cupressus thuyoides.

———— *sempervirens.*

Pinus balsamea.

———— *larix.*

———— *canadensis.*

———— *sylvestris.*

———— *picea.*

———— *abies.*

———— *nigra.*

———— *pinea.*

———— *strobus.*

———— *pinaster.*

———— *cedrus.*

Thuya occidentalis.

———— *orientalis.*

Rarer kinds are thus classed by Mr. G. Gordon, of the Chiswick Gardens:—

Section I.—*Mexican Species.*

1st Division.—Fine-leaved, with long slender leaves; these may be expected not to be so hardy as the other species belonging to this section.

Pinus Terocote.

———— *patula.*

———— *apulcencis.*

———— *Devoniana.*

———— *macrophylla.*

———— *Pseudo-Strobus.*

———— *Leiophylla.*

———— *Oocarpa.*

———— *Oocarpoides.*

———— *filifolia.*

———— *Montezumæ.*

2d Division.—Swamp Pines, with long leaves and few branches, like *P. pallustris*; they may be expected to prove hardy.

Pinus Hartwegii.

———— *Russelliana.*

3d Division.—Short leaved; which may be considered as hardy.

Pinus Llaveana.

—— *Ayacahuite.*

Abies religiosa.

Section II.—Californian or North West American species.

1st Division.—Fine leaved. These are the tenderest kinds, while those with short leaves are generally hardier, particularly in this American group.

Pinus insignis.

—— *californica.*

—— *Monticola.*

2d Division.—Coarse leaved. With robust stems, leaves, and cones.

Pinus Macrocarpa.

—— *Sabiniana.*

3d Division.—Short leaved. All either Spruces or Silvers.

Abies amabilis.

—— *grandis.*

—— *nobilis.*

—— *Menziesii.*

Section III.—European Species.

1st Division.—The slender two-leaved pines; or those resembling the Aleppo Pine. (*P. halepensis.*)

Pinus Brutia.

—— *Pithyusa.*

2d Division.—The robust two-leaved species; or those strong growing kinds, resembling the Cluster Pinaster, and Corsican Laricie, Pines.

Pinus nigricans, or austriaca.

—— *hispanica, or pyrenaica.*

—— *romana.*

—— *Ascarena.*

—— *Lemoniana.*

3d Division.—The Silver or Spruce Firs.

Picea cephalonica, or Mount Enos Fir.

Pinus Pinsapo, or the Mount Atlas Cedar.

Section IV.—Asiatic Species.

1st Division.—The robust two-leaved Pines, or those resembling the Cluster Pine (*P. Pinaster*).

Pinus taurica.

2d Division.—*Pinus Sinensis*, or the Chinese Pine.

Pinus excelsa, or the lofty Bhotan Pine.

Pinus Longifolia.

—— *Gerardiana.*

3d Division.—The Silver, or Spruce Firs.

Abies Webbiana, or the purple-coned Silver Fir.

Pindrow, or Royles Silver.

Abies Pichta or Sibirica, the Pitch or Siberian Silver.

Abies Brunioniana, the Indian Hemlock Spruce.

Abies Khutrow, the large coned Indian Spruce.

Abies Morinda.

Abies orientalis.

The following notice of Junipers will be confined, like the preceding of Coniferous Plants, to the more rare and less known kinds.

True Junipers. *Juniperus oblonga* (the oblong-fruited Juniper); *Juniperus Oxycedrus* (large brown-fruited Juniper); *Juniperus macrocarpa* (the large purple-fruited Juniper); *Juniperus squamosa* (the Creeping Indian Juniper); *Juniperus recurva* (the recurved Indian Juniper); *Juniperus nana* (Dwarf Juniper).—*Gard. Chron.*

Propagation by Cuttings. Mr. Gordon gives these directions:—

“In August or September, select a young shoot of moderate strength, and cut it off with a piece of the last year's wood attached, forming what is technically termed a heel.

“The leaves at the bottom of the cutting should not be pulled off, but must either be left on entire, or shortened with a sharp knife. When the cutting is made, it should be planted from a half to three-quarters of an inch deep in a pot, filled about one-third with potsherds, on which a layer of turfy peat should be placed, then an inch of good loam, and, on the top of all, a layer of white sand. The pot of cuttings may now be placed in a cold frame, kept close, and shaded when necessary; they may remain in this situation till the end of October, when they should be put in a cold pit for the Winter. Care must be taken at that season, that they do not suffer from frost or damp; but they must on no account have fire heat. About the end of February the pot of cuttings may be removed to a hot bed, a bellglass being placed closely over it; the cuttings will root readily, and many of them will be fit to pot off by the end of June. When first potted off, the young plants should be treated exactly in the same manner as the cuttings are.

“In the case of Junipers and Cypressess, older wood than that used for Pines is necessary, as they have not

sufficient strength to omit roots before the winter, and consequently perish during that season, when only callous. If wood of two or three years' growth be taken, it will be found hardy enough to stand the winter, and with the aid of artificial heat, in the spring will root freely."—*Gard. Chron.*

By Seed.—The same excellent authority gives these directions relative to propagating the coniferæ from seed.

"The cones should be gathered at the beginning of winter: they should be placed in some cool but dry place, until the end of March, at which time the seeds should be taken out of the cones; which in some cases is difficult, without injuring them, particularly if they are kiln-dried, as the seeds are easily damaged by fire heat. The cones of some kinds are so hard—of *Cocarpa*, for example—that it would take weeks on the kiln before they would open. The safest way is to bore a hole through the centre, beginning at the base, or stalk, and afterwards to drive a round piece of hard wood, through the hole, which will split the cones. The seeds may then be removed without injury. If the kinds are new or rare, they should be sown in pans filled with dry sandy loam, and without any mixture, of either peat, leaf mould, or rotten dung; all of which are injurious, and cause the young plants to damp off when they first come up, more especially if it should be damp weather at the time they appear above ground. If the loam is a little stiff, a small portion of sand may be used; but this must be avoided as much as possible, because the more sand there is in the soil the weaker the plants come up. If they are in a doubtful condition, sow the seeds in pans filled with very dry loam, and place them in some dry situation, out of the reach of damp, they will then not be injured; whereas if they were not placed in dry soil, they would be sure to perish, or if sown in damp soil, the like destruction would attend them.

"When spring advances, place the pans in a gentle, but by no means damp heat; taking care, however, to remove them to a much cooler place, before the young plants are fairly above ground, and afterwards harden them off by degrees, giving them but little

water at first; for much depends upon the use made of water, at this period, and the treatment given to them, when in this state, (that is, when the young plant has exhausted the nourishment supplied by the seed, and has to seek subsistence from its own roots;) after which there is little danger of their damping off, except they are over watered. When the plants are fairly up, and a little hardened, they may be potted off singly, into small pots, filled with a mixture of loam and sandy peat. If the loam is rather poor or stiff, a little leaf-mould may be added; for the bad effects of the two latter substances seem only to occur during the time the young plant received its support from the seed.

"When potted, they should be placed in a close pit or frame for a few days, until they recover the effects of the shift, and afterwards air must be freely admitted; but water given rather sparingly at first. They will require little trouble afterwards, but probably may want shifting into larger pots in the autumn, (particularly the strong growing kinds,) as it is injurious to their future growth for their roots to get pot-bound when young. The more rare or tender kinds should not be planted out before the third season; but the commoner ones may be planted out after the first year.

"The common kinds, such as the Scotch fir, larch, spruce, and silver firs, Pinaster, Stone, and Weymouth seeds, and even the Deodar, and Cedar of Lebanon may be sown in the open border with great advantage in the following manner:—select a good fresh loamy soil which is not stiff, but rather sandy, and about the end of March dig and break the surface rather finely; then mark the ground out into beds about four feet wide, leaving an alley of a foot wide between each bed; and on some fine dry day sow the seeds broadcast rather thickly, covering them over from a quarter to half an inch deep, according to the size of the seeds; then smooth the surface by gently beating it with the back of the spade;—(this must only be done if the soil is dry, and rather light.) They will then require no other care except keeping them from weeds, and the attacks of birds, mice, and slugs, which are very destructive to them, when

they first make their appearance above ground.

"By placing some small branches thickly over the beds until the young plants have thrown off the old seed-coat, they may be protected from the ravages of birds; if attacked by mice, traps must be set for catching them, as the only safe mode of preventing such pests; and if subject to be eaten by slugs, some wood-ashes should be sown over the beds just as the young plants are making their appearance.

"The seeds of the greater part of the pine tribe come up in about six weeks after sowing in the open border, and the most of them will be fit for transplanting into nursery-rows the first year after sowing; afterwards they may be treated in the same way as other forest trees."—*Gard. Chron.*

Grafting, &c.—"The pine or fir tribe are sometimes increased by grafting or inarching. It is at present little practised, and when it is so, only as a means of propagating some of the curious varieties of the proper section *Pinus*, which are the most difficult and uncertain to strike from cuttings. Procure some good healthy young plants of the common kinds, of the same section to which the sort to be increased belongs in pots; if it is to the robust two-leaved section, such as the *Pinaster* or *Stone Pine*, procure them for the stocks: if to the *Weymouth* or *Scotch*, procure them, but they will take on the common *Scotch Fir*. If the species or variety belongs to the *Spruce* or *silver* tribe, procure such for stocks; if it belongs to the *cedar* or *larch* section, the common *larch* will do, bearing in mind that the species intended to be united should be as nearly related as possible; for although the true *Pinus* may be worked on a *larch* stock, they will soon perish. The operation is performed on the current year's growth by cleft grafting, (and always in the leading shoot, shortening several of the side shoots at the time,) or by splitting the stock down the centre after the head is removed sufficiently deep for receiving the scion, which must be cut wedge-shaped, to fit.

"The time of performing the operation is when the young shoots are about half-grown, and are brittle with the stock; the operation is done in the usual way afterwards, by tying, and excluding the air.

"*Inarching* is another way for increasing the pine tribe, but, like grafting, only suitable for the propagation of curious varieties, and is certainly a more unsightly way than that of cleft-grafting, as the stock and scion hardly ever unite to cover the old heel, when separated from the mother plant.

"This operation may be performed either with the last year's or the preceding year's wood, but the former is by far the quickest in taking; it is best performed about the same time as grafting, but the inarches must not be removed for two years.

"*Layering* is certainly one of the best modes, where it can be done. Layering should be performed early in the spring, before the plant begins to grow, and in the usual common way, by slightly tonguing and laying the shoots in light sandy soil, pegging them securely down.

"They will require two years to root, but it should be observed, that in layering, the whole plant must be layered, as it is very uncertain if only the bottom branches are so done, as these frequently die after the operation if the upper ones are left on: therefore the whole plant should be bent down, or the head cut off.

"Pines and firs should be planted in the open ground, about the end of April, if they are rare or tender kinds: but if hardy and common ones, the end of February is best.

"*The Soil* most suitable for them is a light sandy loam, on a dry subsoil; but they will all grow in almost any soil that is not overcharged with water, or too poor, if encouraged at first by mixing a little sandy loam and leaf-mould with the common earth, when planting them where they are permanently to remain.

"In planting, the roots should be spread out as much as possible, and kept near the surface, leaving the plant a little elevated on a small mound, if the adjoining ground is level, but if on a declivity, it is of no consequence.

"When planted, they should be well watered, not immediately at the roots, but for a yard or two all round, and then a few spruce fir or other branches should be stuck round, to break off the sun's rays, and the winds; if they are tender they should have a large hand-glass over them for the first winter,

which may remain permanently on during the months of December and January.

"In preparing the compost for them, a little sand should be used, if the soil of the place is tolerably good, but rather stiff; but if poor and light, a little loam and leaf mould must be added; it is by far the best way to accustom the plants to the common soil at once, while they are young, for if the ground is made good for their reception only, they will grow vigorously and rapid, and as soon as they exhaust the prepared soil, they become stunted, and frequently die prematurely.

"In protecting the tender kinds, a single mat covering at a sufficient distance will keep most of them from injury; but much damage is done to the plants by not being able to remove the covering early in the spring.

"The covering should be constructed so that the top can be removed during the day time, and replaced at night, which hardens the plants, and at the same time protects them from the effects of the late spring frosts, which destroy the young shoots, especially of *Webbiana*, and other silver firs.

"In *pruning* there is little to be done except to cut away all dead branches, and to protect the leader."—*Gard. Chron.*

CONNARUS. Three species. Stove evergreen shrubs. Ripened cuttings. Peat and loam.

CONOCARPUS. Four species. Stove evergreen shrubs. Ripened cuttings. Loam and peat.

CONOSPERMUM. Nine species. Green-house evergreen shrubs. Cuttings. Sandy peat.

CONOSTYLIS. Three species. Green-house herbaceous perennials. Division. Sandy peat.

CONSERVATIVE WALLS. See *Walls*.

CONSERVATORY. This structure is a green-house communicating with the residence, having borders and beds in which to grow its tenant plants; or it may be an appendage to the dwelling, of moderate size, into which the plants from the green-house are removed whilst in bloom, thus concentrating the more attractive specimens, and presenting a continuous show of flowers.

Good plants for turning out into the beds of a conservatory are:—*Templeto-*

nia Glauca; *Luculia gratissima*; *Eutaxia myrtifolia*; *Pimelea spectabilis*; *Chorozema varium*; *Brugmansia sanguinea*; *Crowea saligna*; *Cytisus racemosus*; *Horea Celsi*; together with *Camellias*, and the different kinds of *Acacia*.

Mr. Beaton observes, that—"In some instances the more hardy stove climbers are now planted out into the conservatory after they have been grown in vineries, or other forcing-houses, or in stoves, till they are long enough to reach the top of the house at once, which is kept sufficiently close to afford them the necessary temperature. Many of this class must necessarily be left naked at bottom, where the air of the house is too cold for their young shoots, and thus a space is left for choice woody plants that are not climbers, among which the subject of these remarks may take a leading place.

"At present, when climbers get naked at the bottom, the practice is either to cover the parts with long shoots from the top of the house, or to plant slender-growing climbers round them; but a better way would be to select fine plants, not exceeding ten or twelve feet in a rich border, or that might be easily kept to be the required height, by pruning, such plants being remarkable for some peculiar feature, such as a graceful mode of growth, fine foliage, conspicuous or sweet-scented flowers, &c. A situation of this kind would suit *Luculia gratissima*, particularly if it happened to be near the doors or source of ventilation.

"This beautiful shrub, so lovely in the autumn, although a strong growing plant, is a delicate feeder; and a strong climber planted behind it may be said to assist its growth rather than impede it, by appropriating to itself the more gross parts of the soil in the border. If the climber, however, is of the very fibrous-rooted kind, like the ash, few plants can compete with it for nourishment; whereas such climbers as *Ipomœa*, *Horsfallia*, *Combretum purpureum*, *Beaumontia grandiflora*, and most of the Passion flowers, *Hardenbergias*, *Zichyas*, &c., form their roots differently, and are suitable for this kind of furnishing when they become naked below. Plants for such a purpose ought to be well established and of considerable size, before they are finally planted

out; and all plants, whether climbers or otherwise, that have been first reared in the stove, or in heat, ought to be thus treated, otherwise it is found in practice that many of them make little progress for the first season or two.

"Another cause which operates against the free progress of some climbers is, that for the sake of convenience they are increased from cuttings of the flowering shoots, which are more or less stunted, and the young plants for a time retain that character, until forced by a good feeding or strong heat to assume their native freedom; and even after that is effected, if they are afterwards much confined in small pots, they become again stunted; then the best remedy is to cut them down to the surface of the ground, and force them in a hot-bed to make a fresh growth. *Beaumontia grandiflora*, and some of the stove Bignonias, are the first to suffer from either cause; yet when they are young and vigorous, they grow from ten to twenty feet in length in one season, and some Bignonias even much more. The former should be about two or three years old, and from fifteen to twenty feet in length before it is planted in the conservatory, where it flowers freely for two or three months, in terminal heads, of large white trumpet-shaped flowers."—*Gard. Chron.*

CONTORTION. See *Deformity*.

CONVALLARIA. The Lily of the Valley. One species, and two varieties. Hardy herbaceous perennials. Division. Common soil.

CONVOLVULUS. Fifty-one species. Chiefly twiners. The stove and green-house plants thrive best in loam and peat, and increase by cuttings; the hardy kinds, and green-house annuals and biennials, by seeds. Common soil.

COOKIA *punctata*. Stove evergreen tree. Ripened cuttings. Loam and peat.

COOPERIA. Two species. Green-house bulbous perennials. Seeds. Sandy compost.

COPTIS *trifoliata*. Hardy herbaceous perennial. Division or seeds. Peat soil.

CORAL TREE. *Erythrina corallodendron*.

CORAXIC POISON BULB. *Brunsvigia coronica*.

CORBULARIA *serotina*. Hardy bulbous perennial. Offsets. Sandy loam.

CORCHORUS. See *Sherria*.

CORDIA. Thirty species. Stove evergreen trees or shrubs. Cuttings. Loam and peat.

CORDYLINE. Two species. Stove evergreen shrubs. Suckers. Peat and loam, or any light vegetable soil.

COREMA *alba*. Hardy evergreen shrub. Layers. Sandy peat.

COREOPSIS. Twenty-three species. Chiefly hardy herbaceous perennials. Cuttings and division. Rich light soil. The annuals and biennials by seeds. Common soil.

COREOPSIS. See *Chrysostemona*.

CORETHROSTYLIS *bractea*. Green-house shrub. Cuttings. Sandy loam and peat.

CORIANDRUM *sativum*. Coriander. Hardy annual. Seeds. Common soil.

CORIARIA. Two species. Hardy and green-house evergreen shrubs. The hardy species is increased by cuttings of the roots or suckers. Common soil. The green-house species by cuttings. Sand, loam, and peat.

CORIS *monspeliensis*. Green-house biennial. Seeds. Peat and loam.

CORK TREE. *Quercus suber*.

CORNELIAN CHERRY. *Cornus mascula*.

CORN FLAG. *Gladiolus bullatus*.

CORN SALAD. See *Lamb's Lettuce*.

CORNUS. Thirteen species, and some varieties. Chiefly hardy deciduous shrubs and trees. Seeds or layers. Common soil. The herbaceous species thrive best in peat, and increase by division of the root.

C. florida is a common tree in the United States. It is a pleasing object when in bloom; its creamy white bractea enlivening the woodland when but few plants have yet expanded their flowers.

CORNUTIA *pyramidata*. Stove evergreen shrub. Cuttings. Loam and peat.

CORONILLA. Sixteen species, and one variety. Chiefly half-hardy evergreen shrubs. The green-house species are increased by cuttings or seeds. Peat and loam. The herbaceous require protection in severe weather. Seeds or division. The hardy annuals. Seeds. Common soil. Some are hardy deciduous creepers.

CORRÆA. Nine species. Green-house evergreen shrubs. Cuttings. Sand and loam.

CORRIGIOLA. Three species. Hardy trailers. Seeds. Common soil.

CORTUSA *Mathiæ*. Hardy herbaceous perennial. Requires protection in severe weather. Division or seeds. Peat and loam.

CORYANTHES. Three species. Stove epiphytes. Division. Wood.

CORYCIUM. Two species. Half-hardy orchids. Division. Loam and peat.

CORYDALIS. Twenty-four species. Hardy annuals, biennials, or tuberous-rooted perennials. The latter increase by division. Peat and loam. The annuals by seeds. Common soil.

CORYLUS. Nut Tree. Seven species, and many varieties. Hardy deciduous shrubs. Suckers or layers. Common soil. See *Filbert*.

CORYNOCARPUS *lavigatus*. Green-house evergreen tree. Layers. Rich mould.

CORYPHA. Eight species. Palms. A strong moist heat, and sandy loam.

COSCENIUM *fenestratum*. Stove evergreen climber. Division. Loam and peat.

COSMEA. Seven species. Green-house or hardy annuals. Seeds. Common soil.

COSMELIA *rubra*. Green-house evergreen shrub. Cuttings. Sandy peat.

COSMUS. Three species. Hardy and green-house tuberous-rooted perennials. Division. Common soil. *C. tenuifolius* is a hardy annual, increased from seeds.

COSSIGNIA *borbonica*. Stove evergreen shrub. Cuttings. Peat and loam.

COSTMARY. See *Balsamita*.

COSTUS. Twelve species. Stove herbaceous perennials. Division or seed. Peat and loam.

COTONEASTER. Ten species, and some varieties. Hardy deciduous shrubs. Layers. Common soil.

COTYLEDON. Thirty-six species. Green-house evergreen shrubs: a few herbaceous perennials. Cuttings dried in the sun. Sandy loam.

COULTERIA. Two species. Stove evergreen shrubs. Seeds. Peat and loam.

COURGOURDE. *Lagenaria vulgaris*.

COUTAREA *speciosa*. Stove evergreen shrub. Cuttings. Sandy peat.

COWANIA *plicata*. Hardy evergreen shrub. Division. Sandy peat.

COWBERRY. *Vaccinium Vitis Idea*.

COWDIE PINE. *Dammara australis*.

COWSLIP. (*Primula veris*.) There are several varieties, varying in colour from almost white to a very deep yellow; some are single, but others are double, in the form that florists distinguish as *hose-in-hose*, the calyx in these being converted into corolla. Some specimens will produce one hundred pips upon a single truss, and they have been known to yield even more than one hundred and fifty.

The cultivation is the same as that of the *Polyanthus*.

CRAMBE. Three species. Hardy tuberous-rooted perennial. Division or seed. Rich soil. See *Sea-kale*.

CRANBERRY. *Oxycoccus palustris*.

CRANE'S BILL. *Geranium*.

CRASSULA. Fifty-nine species and a few varieties. Hardy evergreen annual or biennial shrubs. Cuttings laid for a few days in the sun. Sandy loam and brick rubbish.

CRA TÆGUS. Hawthorn. Fifty species and many varieties. Chiefly hardy deciduous low trees. Seeds, buds, or grafts.

Dr. Lindley gives the following list of the most showy kinds.

C. Aronia.—Most showy species of all in the autumn; very large bright yellow fruit in great abundance.

C. Tenacitifolia.—Upright growing, finely cut leaves, the largest fruit of all, yellow.

C. Odoratissima.—A spreading tree; downy leaves, numerous large bright red fruit in the autumn.

C. Orientalis.—Large dark red fruit.

C. Coccinea.—Very showy; large and numerous bunches of bright red fruit in the autumn.

C. Glandulosa.—Dense bush, and is ornamental in the autumn, covered with abundance of rather large red fruit.

C. Punctata.—Three varieties, one with red fruit, another with yellow, and a third with an upright or fastigate habit of growth.

C. Oliveriana.—Small, deeply cut, woolly leaves, and small black fruit, numerous and ornamental in the autumn.

C. Douglasii.—Various shaped leaves and black fruit, which ripen early in the autumn.

C. Nigra.—Strong growing, with black fruit and deeply divided leaves, flowering rather early.

C. Heterophylla.—Beautiful species, profusion of flowers in the spring, and numerous small red fruit in the autumn.

C. Macracantha.—With immense spines and small shining yellowish-red fruit, produced in large bunches early in the autumn.

C. Pyrifolia.—Free flowering kind, with small, but very numerous yellowish-red fruit, which ripen very late in the autumn.

C. Crus-Galli.—Bright shining green leaves, and numerous bunches of dark-red fruit, which ripen very late in the autumn. The most desirable is the variety called *salicifolia*, which has horizontal branches, forming a flat table-shaped head.

C. Prunifolia.—A close bush, rather large shining leaves, and numerous bunches of dark-red fruit, which ripen late in the autumn.

C. Flava.—Small greenish-yellow fruit late in the autumn.

C. Virginiana.—A dwarf kind, with numerous green fruit, it retains its fruit nearly all the winter.

C. Cordata.—The latest in flower, and bears the smallest fruit; it has bright shining angular leaves, and bright red berries.

C. Oxycantha Rosea Superba.—The most brilliant of all when in flower, it bears bright crimson blossoms in May. The double variety of it has also flowers, nearly as intense in colour, and quite double.

CRATÆVA. Four species. Stove evergreen trees. Cuttings. Rich strong soil.

CREEPERS or TRAILERS are plants which by having numerous stems and branches resting upon and spreading over the soil's surface, are useful for concealing what would be displeasing to the eye.

CRESCENTIA. Three species. Stove evergreen trees. Ripened cuttings. Loam and peat.

CRESS. (*Lepidium sativum*.)

"The GARDEN CRESS, or PEPPER GRASS is a hardy annual plant; its native country is unknown. It is cultivated in gardens for the young leaves which are used in salads, and have a peculiarly warm and grateful relish.

"The varieties are the *plain leaved*,

curled leaved, and *broad leaved*. The method of cultivation is the same as is used for the parsley. To have a constant supply in perfection, very frequent sowings should be made; during hot, dry weather, it should be sown in the shade of trees, or protected by brush, &c., from the direct rays of the sun."—*Rural Register*.

CRESS ROCKET. See *Vella*.

CRINUM. Sixty-six species and some varieties. Stove or green-house bulbous perennials. Offsets. Rich loam, peat, and sand.

C. capense, is thus recommended by the best cultivator of the amaryllidæ, to which the Crinum belongs. The Rev. W. Herbert says,—"Crinum capense is good for covering small islands, as affording by its abundant arched foliage, the best possible covert for wild fowl, and producing an abundant succession of beautiful flowers throughout the summer, and even the autumn. The plant is equally capable of flowering and ripening its seed when planted in a border, or two feet under the surface of the water, or in a rainy season. It could be best planted a little above the level of the water. The seed sprouts as soon as it is ripe, and the young plants should be sheltered in pots the first and second winter, and then planted out; taking care that the weeds do not smother them while young. The bulbs when full grown are hardy."—*Gard. Chron*.

CHRISTARIA *coccinea*. Hardy herbaceous perennial. Division or seeds. Peat soil.

CROCUS. Many species and varieties. Hardy bulbous perennials. Offsets or seeds. Light sandy soil.

Spring Crocuses.—*C. vernus*: of this there are about five varieties, varying in colour, chiefly yellow, white, purple, and blue; *C. annulatus*, four varieties, blue and white; *C. speciosus*, three varieties; *C. pulchellus*; *C. Sibthorpianus*; *C. lavigatus*, two varieties; *C. lageniflorus*, many varieties; *C. campestris*; *C. cancellatus*; *C. reticulatus*, four varieties; *C. gargaricus*; *C. Siberianus*; *C. Fleischerianus*; *C. parvulus*; *C. pyreæus*; *C. asturinus*; *C. serotinus*; *C. salamaunianus*; *C. versicolor*, five varieties; *C. imperialorianus*; *C. suaveolens*; *C. insularis*; *C. odoratus*; *C. tongiflorus*; *C. medius*; *C. Pallasianus*; *C. Theresianus*, two varieties; *C. sativus*.

Of the *Autumn Crocus*, the Rev. Dr. Herbert particularizes the following :

C. Damascenus, pale purple; *C. Byzantinus*, white; *C. Tournefortianus*, French white; *C. Cambessedesianus*, white, streaked with purple; *C. medius*, purple; *C. Cartwrightianus*, purple; *C. var. Creticus*, purple and pink; *C. Chusianus*, light purple.—*Bot. Reg.*

Characteristics of Excellence.—

“First.—It should be composed of six petals, three inner and three outer; but fitting so close as to form a cup the shape of half a hollow ball.

“Second.—The petals should be broad enough and blunt enough at the ends to form an even edge all round the cup, and lap over each other so much as to have no indentations where they join.

“Third.—The petals should be thick and smooth on the edge, without notch or serratine.

“Fourth.—The colour should be dense and all over the same, if the variety be a self; and the marking should be very distinct, if variegated.

“Fifth.—It should be hardy enough to stand the frost, for those which are spoiled by the frosts, which come after they flower, are almost worthless, because they all bloom early, before the frosts are gone, and therefore their only beauty would be destroyed unless they stood the cold well.

“Lastly.—They ought to bloom abundantly, the flowers succeeding each other to lengthen the season of their bloom.”—*Hort. Mag.*

Cultivation.—“The seeds of crocuses are best sown thinly, immediately after being gathered in light dry earth in large pots or pans, with a sufficiency of holes and potsherds at the bottom for the purpose of draining all, and cover not more than half an inch with the mould. The most eligible aspect or situation until the autumnal rains set in, is a moderately shady, yet unsheltered one, permitting them to receive all the influence of the weather, except such heavy showers as would wash bare the seeds. As soon, however, as the autumnal rains commence, remove to a warm aspect; and protect them from all excessive rains, frosts, and snows, by the occasional shelter of a garden-frame, allowing them, nevertheless, the benefit of the full air at other times; but more especially after the seminal leaf for they

have but one, (being monocotyledonous plants,) appears above the surface of the earth.

“This occurs sometimes about the end of the year; but oftener in earliest spring. After this it is essential that they should have complete exposure to the air, even in frosty weather, screening them, however, occasionally with loose straw from other injurious effects of frost. In this manner may the young crocuses be treated until the sun acquires sufficient power to dry the earth, or as to require daily waterings. It will be then found advantageous to remove them to a cooler, but not sheltered situation, and here they may remain until their leaves lie down; giving them at all times, and in every situation, while their leaves are growing, such discretional rose waterings, when the sun is not shining, as they may reasonably appear to require; but never until the earth they grow in becomes dry; not any whatever after their leaves begin to look yellow. After this period it is necessary to defend them from all humidity, except dews and gentle rains, until the end of August or beginning of September.

“If the surface of the earth is occasionally stirred with the point of a knife it will never fail to be attended with beneficial effects, and invigorate the bulbs; if notwithstanding the precaution of thinly sowing the seeds, the plants should have grown so thickly together as to have incommoded each other, it will be desirable to have such taken up and replanted immediately further asunder in fresh earth, and about three quarters of an inch deep. But if they are not too crowded, they will require no shifting; sift a little earth over them, previously stirring and cleaning the surface of the old from moss and weeds, and observing not to bury the young bulbs, not yet so large as lentils, deeper than three quarters of an inch, or an inch at the most. The second season requires exactly the same management as the first. But as soon as their second year's foliage has passed away, the roots should all be taken up and replanted again, the same or following day, into fresh earth of the same kind as before; sifting over them in autumn half an inch of fresh earth. The spring following, if they have been duly attended to, most of them will show

flowers; a few, perhaps, having done so in the midst of their fourth crop of leaves."—*Hort. Soc. Trans.*

They are very hardy, and require no care till the leaves begin to fade, when they should be taken up and kept in a state of rest for two or three months: some do not take them up oftener than once in three years, which answers very well for the border sorts. Even these, however, should not be left longer; because, as the young bulbs are formed on the top of the others, they come nearer to the surface every year, till at last, if neglected, they are thrown out and lost.—*Enc. Gard.*

Soil, &c.—They like a warm, dry, light soil, in which they will thrive for many years without requiring removal. Both are, however, better for being taken up occasionally, because in that way their roots are exposed to fresh soil, and are not obliged to search through exhausted earth for their necessary food. They are fond of cow-dung as a manure; it may be applied just after Christmas.—*Gard. Chron.*

CROWEA. Two species. Green-house evergreen shrubs. Cuttings. Loam and peat.

CROWN IMPERIAL. See *Fritillary*.

CRUCIANELLA. Fourteen species. Hardy annuals and herbaceous perennials. *C. americana* and *C. maritima* are green-house evergreen shrubs. Cuttings. Loam and peat.

CRYPTANDRA. Two species. Green-house shrubs. Cuttings. Rich light loam.

CRYPTOCHILUS sanguinea. Stove orchid. Offsets. Peat and potsherds.

CRYPTOLEPIS elegans. Stove evergreen climber. Cuttings. Peat and loam.

CRYPTOMERIA japonica. Japan Cedar. "Hardy evergreen tree, which will probably prove one of the most ornamental of the Coniferae. Sow the seed in sandy loam in a cool place; pot singly; the first year it will attain a height of from twelve to eighteen inches. It grows rapidly, and is as easily managed as the Chinese Arbor Vitæ (*Thuja Orientalis*), succeeding in almost any soil or situation, not very poor or wet."—(*Hort. Soc. Journ.*)—It will be propagated, probably, by cuttings.

CRYPTOSTEGIA. Two species.

Stove evergreen twiners. Cuttings. Loam and peat.

CRYPTOSTEMMA. Three species. Hardy annuals. Seeds. Common soil.

CUCKOO-FLOWER. *Lychnis flos-cuculi*.

CUCKOO-FLOWER. *Cardamine pratensis*.

CUCKOO-SPIT. See *Tettigonia*.

CUCULLIA verbasci. Mullien Shark. The caterpillars of this moth are very destructive to Verbascums in June and July. Mr. Curtis describes them as being "about two and a half inches long, bluish white and thickly sprinkled with black and bright yellow spots; when touched, they emit a considerable quantity of dark green fluid from their mouths. When they have attained their growth, they burrow into the ground at the roots of the plant on which they have been feeding, and in a few days form a cocoon made principally of half rotted leaves and fine mould, and bound firmly together with silk, so as to resemble a stone, or a small lump of earth. They remain in this state till the following May, and sometimes for two years, when they emerge as pretty blackish brown moths. The wings, when extended, measure between one and two inches across; the upper pair are brownish, clouded with black, and have on the inner edge a pale white patch, resembling the figure 3, or the Greek letter ε; the lower wings are pale brownish, and sometimes nearly white, and have a broad dark border. We have seen those caterpillars in such abundance in some gardens, as to completely destroy all the different kinds of Mullein, and the nearly allied plants. The only way to lessen their ravages, is to collect and kill the caterpillars."—*Gard. Chron.*

CUCUMBER. *Cucumis sativus*. This, like many other esculent vegetables, has been divided into a number of varieties and subvarieties, the greater portion of which could be easily dispensed with; for all useful purposes, three or four varieties are amply sufficient. "Those principally grown are the Early Frame and Long Green Prickly. The Early Frame is of moderate length, prickly, and is the variety generally used as the early crop for salad.

"The Long Green is mostly grown for pickling; all the varieties are very

tender, not bearing the least frost. For an early supply start some plant in pots or boxes, early in the spring, and when the season is more advanced set them out on a well sheltered border, in hills, with some thoroughly rotted manure incorporated with the soil. Seed for succeeding crops may then be planted. For pickles, plant the latter end of June and beginning of July. The Cucumber, like the Squash, &c., is liable to be preyed upon by yellow bugs, which are very destructive. To counteract them prepare a mixture of slaked lime and wood ashes, and sprinkle it freely on the leaves and stems whilst the dew is on, that it may adhere. As often as it may be washed or blown off, repeat the application, till the enemy be conquered.

“For the method of making sieves or boxes to protect cucumber vines, melon vines, &c., against the yellow bug, see the *New England Farmer*, vol. 2, page 305.”—*Rural Register*.

To force Cucumbers.—Most persons who have the requisite conveniences force this vegetable. The following hints may be useful, even to those who have some experience.

The hot-bed for seedlings must be moderate, and a single one or two light frames will be quite sufficient if dedicated to their cultivation. The mould need not be more than five or six inches deep. The seed is best sown four together in small pots, and plunged in the earth of the bed; but whether here or in the mould, it must not be buried more than half an inch deep. Two or three days after sowing, or when the seminal leaves are half an inch in breadth, those in the mould of the bed must be pricked three together in small pots, quite down to their leaves in the earth, which should be brought to the temperature of the bed before this removal, by being set in it for a day or two previously; those seedlings that have been raised in pots, must likewise be thinned to three in each. They must remain plunged in the hot-bed until their rough leaves have acquired a breadth of two or three inches, when they are fit for ridging out finally.

During this first stage of growth, great care must be taken that air is admitted every day as freely as contingent circumstances will admit, as also at night, if the degree of heat and steam

threatens to be too powerful. It must never be neglected to cover the glasses at night, apportioning the covering to the temperature of the air and bed. The heat should not exceed 80° in the hottest day, or sink below 65° during the coldest night.

If the heat declines, coatings of hot dung are to be applied in succession to the back, front, and sides, if that source of heat be employed. As the mould appears dry, moderate waterings must be given, care being taken not to wet the leaves. The best time for applying it is between ten and two of a mild day, the glasses being closed for an hour or two after performing it. The temperature of the water must be between 65° and 80°. The interior of the glass should be frequently wiped, to prevent the condensed steam dropping upon the plants, which is very injurious to them. If the bed attains a sudden violent heat, the necessary precautions to prevent the roots of the plants being injured or scalded, must be adopted; but if hot water is the source of heat, this danger is avoided altogether.

It is a material advantage if, previous to planting finally, the plants be turned into pots a few sizes larger, without at all disturbing the roots, and plunged into a hot-bed for a month longer, the same attention being paid them as before.

The second stage of cultivation is planting them out into hot-beds for final production. The hot-bed for their reception must be of the largest size, as being required to afford a higher and longer continued warmth through the coldest periods of the year.

When the earth is put on, it is at first to be spread only two or three inches deep, but under the centre of each light a hillock must be constructed, eight or ten inches deep and a foot in diameter. The earthing should be performed at least four or five days before planting, at which time the earth must be examined; if it be of a white colour and caked, or, as it is technically termed, burnt, it must be renewed, for the plants will not thrive in it, and holes bored in the bed to give vent to the steam.

The mould of the hillocks being well stirred, the plants must be turned out of the pots without disturbing the ball of earth, and one containing three plants

inserted in each; a little water, previously heated to the requisite temperature, must be given, and the glasses kept perfectly close until the next morning. Any plants not in pots must be moved by the trowel with as much earth pertaining to their roots as possible. The shade of a mat is always requisite during the meridian of bright days until the plants are well established. They must be pressed gradually away from each other, until at least eight inches apart; nothing can be more erroneous than to allow them to proceed with the stems nearly touching.

When well taken root, earth must be added regularly over the bed, until it is level with the tops of the mounds; for if there be not a sufficient depth of soil, the leaves will always droop during hot days, unless they are shaded, or more water given them than is proper.

An important operation for the obtaining early fruit, but by no means so necessary for later crops, is the first pruning, or as it is termed, *stopping* the plant, that is, nipping off the top of the first advancing runner, which is to be done as soon as the plant has attained four rough leaves; this prevents its attaining a straggling growth, and compels it at once to emit laterals, which are the fruitful branches. When they begin to run, the shoots must be trained and pegged down at regular distances, which not only prevents their rubbing against the glass, but also becoming entangled with each other. Never more than two or three main branches should be left to each plant, all others to be removed as they appear. If more are left it causes the whole to be weak, and entirely prevents the due exposure of the foliage to the sun. The greatest care is necessary in regulating the temperature; it must never be allowed to decline below 70° or rise above 95°. As it decreases, coatings of hot dung must be applied to the sides, and the covering increased. The temperature of the bed, as well as of the exterior air, governs also the degree of freedom with which the air may be admitted; whenever allowable, the glasses should be raised. The best time for doing so, is from ten to three o'clock.

It may not be misplaced to remark, that chilly foggy days are even less propitious for admitting air than severe frosty ones; during such it is best to

keep the frames close, and to lessen the opening of the glasses, in proportion as the air is cold or the beds declining, it never exceeding two inches under the most favourable circumstances. Water is usually required two or three times a week; it must be warmed as before mentioned previously to its application. Instead of watering the inside of the frame, it is a good plan to do so plentifully round the sides, which causes a steam to rise, and affords a moisture much more genial to the plants than watering the mould.

The last stage of growth includes the blossoming and production of fruit. The training must be regularly attended to, and all superabundance of shoots and leaves especially kept away. If the plants which have been once stopped have extended their runners to three joints without showing fruit, they must be again stopped.

The impregnation of the fruit now requires continued attention; as soon as a female blossom, which is known by having fruit beneath the flower-cup, opens, or on the second morning at farthest, a fresh full expanded male flower is to be plucked, with its foot-stalk pertaining to it, and the corolla or flower-cup being removed, the remaining central part or anther applied to the stigma of the female, which is similarly situated, and the fecundating dust discharged by gently twirling it between the finger and thumb. If possible a fresh male blossom should be employed for every impregnation, and the operation performed in the early part of the day. An attention to this is only requisite to such plants as are in frames; those grown in the open air are always sufficiently impregnated by bees and other insects. If impregnation does not take place the fruit never swells to more than half its natural size, nor perfects any seed, but generally drops immaturely. When the male flowers appear in clusters they may be thinned moderately with benefit; but it is almost needless to deprecate the erroneous practice sometimes recommended of plucking them off entirely. As the fruit advances, tiles, sand, or other material, must be placed beneath it to preserve it from specking, or a glass cylinder is still better; if a bulb containing water is attached, the fruit grows faster and finer. The same precautions are necessary as

regards the preservation of temperature, admission of air, &c., as in the second stage of the growth of the plants. Towards the conclusion of the first production, it is a good practice to renew the heat by adding eighteen inches of fermenting dung all round the bed, previous coatings being entirely removed, and to earth over it to the same depth as in the interior of the bed. This prevents the roots, when they have extended themselves to the sides of the bed, being dried by exposure to the air and sun. As the spring advances the glasses may be often taken off during mild days, or even to admit a light temperate rain. In June, or July, according to the geniality of the season, they may be removed finally, and even before, the frames may be raised on bricks, so as to allow the runners to spread at will.

For a middling-sized family, from four to eight lights are sufficient to afford a constant supply, and for a larger one, double those numbers. During midwinter, twelve weeks elapse between the time of sowing the seed and the fitness of the fruit for gathering; but as the more temperate seasons of the year advance, this period decreases gradually to eight. Between the time of impregnation and their full growth, from fifteen to twenty days usually elapse. Under favourable circumstances and management, the same vines will continue in production three or four months.

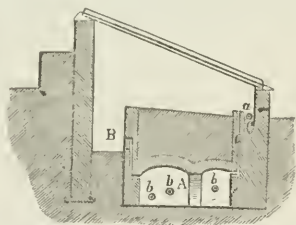
Mr. Mills, one of the most successful growers with dung heat, gives me these leading points of his culture:—

Mr. Mills sows on the 29th of September, and transplants into the fruiting-pit on the 29th of October. Range of temperature in pit, 65° to 85° and 95° ; and of the bottom-heat from 85° to 95° . He uses neither saline nor liquid manure. The water employed is about 80° , but in this Mr. Mills is not particular. Mr. Beaton, to avoid the degenerating almost unavoidably incident to the fancy varieties, if propagated by seed, employs *cuttings* or layers. His practice was also adopted by Mr. Mears, gardener to W. Hanbury, Esq., near Leominster, and is recommended by Mr. McPhail. We also saw a very fine cucumber, ripened in January of this year (1844), by Mr. Mills, from a cutting planted in October. As the end of September is the best time for pursuing this mode of propagation, we will just

state the mode. Put five inches of earth into a twelve pot, in which plant three cuttings, taken from as many vigorous bearing branches; water plentifully; place a sheet of glass over the top of the pot, the sides of which will shade the cuttings until they are rooted; plunge in a hot-bed; and in less than a fortnight the plants will be established. The vines thus raised are not so succulent as those raised from seed, and consequently they are less liable to damp, or to suffer in other ways during winter.—*Trans. Lond. Hort. Soc.*

Hot Water Beds.—If hot water be the source of heat, the following sketch of the bed and frame employed by Mr. Mitchell, at Worsley, is about the best that can be employed. The objects kept in view when it was constructed, were:—“1st. A circulation of air without loss of heat. 2d. A supply of moisture at command proportionable to the temperature. 3d. A desirable amount of bottom heat. 4th. A supply of external air (when necessary) without producing a cold draught.

Fig. 31.



“The method by which the first of these is accomplished, will be understood by referring to the section, in which *a* is the flow-pipes, *bb b* the return pipes in the chamber *A*. It is evident that, as the air in the chamber becomes heated, it will escape upwards by the opening *c*, and the cold air from the passage *b* will rush in to supply its place; but the ascending current of heated air coming in contact with the glass, is cooled, descends, and entering the passage *b*, passes into the chamber *A*, where it is again heated; and thus a constant circulation is produced. In order to obtain the second object, I have to some extent combined the tank and pipe systems.

"The flow-pipe *a* is put half its diameter into the channel *c*, which when filled with water, (or so far as is necessary,) gives off a vapour, exactly proportionable to the heat of the pipe and pit.

"The third requisition is produced by the surrounding atmosphere and heating materials.

"The fourth is accomplished simply by lowering the upper sash; the cold air thus entering at the top only, falls directly into the passage *b*, and passes through the hot chamber before coming in contact with the plants. In order to test the circulation, I fixed a piece of paper near the front of the pit, and found the current to be so strong as to bend it backwards and give it a tremulous motion. When the heat in the chamber is 95° , in the open space over the bed it is 71° ; in the bottom of the passage only 60° ; and in the mould in the bed it is 80° .

"The amount of vapour is regulated with the greatest facility, even from the smallest quantity to the greatest density."—*Gard. Chron.*

Mr. Latter, one of the most successful of cucumber growers, employs hot water, and he gives me these leading points in his culture. He sows in the first week of September, and the vines from this sowing will be in bearing and very strong before February. The seedlings are first shifted into sixty sized pots, secondly into twenty-fours, and lastly into the largest size. If to be trained on a trellis, the runner must not be stopped until it has, trained to a stick, grown through the trellis. The temperature in the pit or frame is kept as nearly 65° as possible during the night, and from 75° to 85° during the day; air being admitted *night and day*, little or much, according to the state of the weather. The bottom heat (Mr. Latter is the champion of the hot-water system) is kept as near as can be to 70° , although he finds that 85° does not hurt the plants. He waters them with soft water until February, and then employs liquid manure, taking care that the temperature of the liquid is always from 75° to 80° . The earth over the hot water tank or pipes ought not to be less than fifteen inches deep. During severe frosts it is an excellent plan to keep a small floating light burning within the frame every night.

Training.—There is no doubt that training near the glass of the frames upon a trellis, makes the cucumber vine more prolific, and more enduring. Indeed, if trained with proper care, the same vine may be made to bear throughout the year.

Hand Glass Crops.—The first sowings for these crops must be in the last two weeks of March; to be repeated in the middle of April and May. The seed may be inserted in a moderate hot-bed under hand-glasses, or in the upper side of one of the frames already in production, either in pots as directed for the frame crops, or in the mould of the bed, to be pricked into similar situation when of four or five days' growth, inserting only two plants, however, in each pot. They must remain in the hot-bed until of about a month's growth, or until they have attained four rough leaves; being then stopped as before directed they are fit for rigging out finally.

The ridges may be founded on the surface, or in trenches a foot and a half deep, in either case forming them of well prepared hot dung, three or four feet wide and two and a half high; the length being governed by the number of hand-glasses, between each of which three feet and a half must be allowed. The earth is to be laid on eight inches thick; when this becomes warm the plants may be inserted two, or at most three, under each glass.

Watering, airing, covering, &c., must be conducted with the precautions directed to be practised for the frame crops. The glasses should be kept on as long as possible without detriment to the plants; to prolong the time the runners must be made to grow perpendicularly; and still further to protract their continuance, if the season is inclement, the glasses may be raised on bricks. When no longer capable of confinement, the runners must be pegged down regularly, advantage being taken of a cool cloudy day to perform it in; but the glasses, even now, may be continued over the centre of the plants until the close of May or early June, with considerable advantage. Weeds must be carefully removed. Waterings should be performed as often as appears necessary.

If there be a scarcity of dung in the last week in April, or during May, cir-

cular holes may be dug, two feet in diameter, one deep, and four apart. These being filled with hot dung, trod in moderately firm, and earthed over about eight inches, are ready for either seeds or plants. With the shelter of the hand-glasses they will be scarcely later in production than the regular ridges.

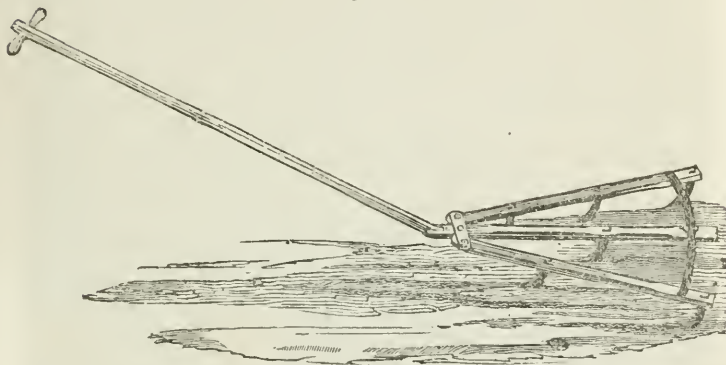
CUCUMIS. Twenty species, and

many varieties. Hardy or half-hardy trailing annuals. Seeds. Good rich soil. See *Cucumber*.

CUCURBITA. Gourds and Pumpkins. Ten species and varieties.—Hardy trailing annuals. Seeds. Good rich soil.

CULCITUM salicinum. Green-house evergreen shrub. Cuttings.—Common soil.

Fig. 32.



“**CULTIVATOR FOR THE HAND** (Fig. 32) Is made of iron, and is capable of being expanded at will; it is of great utility in clearing out between rows of vegetables, loosening the soil, and at once performing the work of four ordinary hoes.”—*Rural Reg.*

CULTIVATORS, OR HOE-HARROWS. “These are now considered indispensable in cultivating corn, potatoes, and all other crops planted in hills or drills—doing the work as effectually as if hoed, and much more expeditiously. The form is varied by the different makers, especially in the teeth or hoes. They are made to expand or contract, so as to accommodate in the distance between the rows.”—*Rural Reg.*

CULLUMBINE or **COLUMBINE.** *Aquilegia.*

CUMIN. See *Cuminum*.

CUMIN. See *Lagoëcia*.

CUMINUM. *Cuminum.* Hardy annual. Seeds. Common soil.

CUMMINGIA. Four species. Half-hardy bulbous perennials. Offsets. Loam and peat.

CUNNINGHAMIA sinensis. Green-house evergreen tree. Cuttings or seeds. Peat and loam.

CUNONIA capensis. Green-house evergreen tree. Cuttings. Sandy loam and peat.

CUPANIA. Seven species. Stove evergreen trees or shrubs. Cuttings. Peat and loam.

CUPHEA. Fourteen species.—Green-house or stove annuals; and stove biennial, herbaceous perennial or evergreen shrubs. The stove species grow best in sandy loam, and increase from cuttings. The annuals—seeds. Common soil.

CUPIA. Three species. Stove evergreen shrubs. Cuttings. Loam, peat, and sand.

CUPRESSUS. Seven species, and some varieties. Hardy or green-house evergreen trees. Seeds or cuttings. Good rich loamy soil.

CURATELLA. Two species.—Stove evergreen shrubs. Cuttings.—Sandy loam.

CURCULIGO. Six species, and variety. Stove or green-house herba-

ceous perennials. Offsets. Loam and peat.

CURCULIO. This genus of Beetle, popularly known as *Weevils*, are destructive to fruit, as nuts, nectarines, and peaches, as well as to peas, &c. There are many species.

C. betuleti. Vine Weevil. Colour, steel-blue. Attacks the leaf, rolling it up as a nest for its eggs. The pear is liable to its attacks also. Appears in June and July.

The species of *Curculio*, which is more fatal in its attack than any other, is popularly known as the Plum-Weevil. We copy the following article on the subject, from *the Fruits and Fruit Trees of America* :—

“The *Curculio*, or Plum-Weevil, (*Rhynchænus Nenuphar*), is the unpromising foe of all smooth-stone fruits. The cultivator of the Plum, the Nectarine, and the Apricot, in many parts of the country, after a flattering profusion of snowy blossoms and an abundant promise in the thickly set young crops of fruit, has the frequent mortification of seeing nearly all, or indeed, often the whole crop, fall from the trees when half or two-thirds grown.

“If he examines these falling fruits, he will perceive on the surface of each, not far from the stalk, a small semi-circular scar. This star is the crescent-shaped insignia of that little Turk, the *Curculio*; an insect so small, as perhaps, to have escaped his observation for years, unless particularly drawn to it, but which nevertheless appropriates to himself the whole product of a tree, or an orchard of a thousand trees.

“The habits of this *Curculio*, or Plum-Weevil, are not yet fully and entirely ascertained. But careful observation has resulted in establishing the following points in its history.

“The Plum-Weevil is a small, dark brown beetle, with spots of white, yellow, and black. Its length is scarcely one-fifth of an inch. On its back are two black humps, and it is furnished with a pretty long, curved throat and snout, which, when it is at rest, is bent between the forelegs. It is also provided with two wings with which it flies through the air. How far this insect flies is yet a disputed point, some cultivators affirming that it scarcely goes farther than a single tree, and others believing that it flies over a

whole neighbourhood. Our own observation inclines us to the belief that this insect emigrates just in proportion as it finds in more or less abundance the tender fruit for depositing its eggs. Very rarely do we see more than one puncture in a plum, and, if the insects are abundant, the trees of a single spot will not afford a sufficient number for the purpose; then there is little doubt (as we have seen them flying through the air,) that the insect flies farther in search of a larger supply. But usually, we think it remains nearly in the same neighbourhood, or migrates but slowly.

“About a week or two after the blossoms have fallen from the trees, if we examine the fruit of the plum in a district where this insect abounds, we shall find the small, newly formed fruit, beginning to be punctured by the proboscis of the Plum-Weevil. The insect is so small and shy, that unless we watch closely it is very likely to escape our notice. But if we strike or shake the tree suddenly, it will fall in considerable numbers on the ground, drawn up as if dead, and resembling a small raisin, or, perhaps more nearly, a ripe hemp seed. From the first of April until August, this insect may be found, though we think its depredations on fruit, and indeed its appearance in any quantity, is confined to the month of May in this climate. In places where it is very abundant, it also attacks to some extent the cherry, the peach, and even the apple.

“Early in July the punctured plums begin to fall rapidly from the tree. The egg deposited in each, at first invisible, has become a white grub or larva, which slowly eats its way towards the stone or pit. As soon as it reaches this point, the fruit falls to the ground. Here, if left undisturbed, the grub soon finds its way into the soil.

“There, according to most cultivators of fruit, and to our own observations, the grubs or larvæ remain till the ensuing spring, when in their perfect form they again emerge as beetles and renew their ravages on the fruit. It is true that Harris, and some other naturalists, have proved that the insect does sometimes undergo its final transformation and emerge from the ground in twenty days, but we are inclined to the opinion that this only takes place with a small portion of the brood, which,

perhaps, have penetrated but a very short distance below the surface of the soil. These making their appearance in midsummer, and finding no young fruit, deposit their eggs in the young branches of trees, etc. But it is undeniable that the season of the Plum-Weevil is early spring, and that most of the larvæ which produce this annual swarm, remain in the soil during the whole period intervening since the fall of the previous year's fruit.

"There are several modes of destroying this troublesome insect. Before detailing them, we will again allude to the fact, that we have never known an instance of its being troublesome in a heavy soil. Almost always the complaint comes from portions of country where the soil is light and sandy. The explanation of this would seem to be that the compact nature of a clayey soil is not favourable to the passage or life of this insect, while the warm and easily permeable surface of sandy land nurses every insect through its tender larvæ state. Plum trees growing in hard trodden court-yards, usually bear plentiful crops. Following these hints some persons have deterred the Plum-Weevil by paving beneath the trees; and we have lately seen a most successful experiment which consisted in spreading beneath the tree as far as the branches extended a mortar made of stiff clay about the thickness of two or three inches—which completely prevented the descent of the insect into the earth. This is quickly and easily applied, and may therefore be renewed every season until it is no longer found necessary.

"The other modes of destroying the Plum-Weevil are the following:—

1. "*Shaking the tree and killing the beetles.* Watch the young fruit, and you will perceive when the insect makes its appearance, by its punctures upon them. Spread some sheets under the tree, and strike the trunk pretty sharply several times with a *wooden mallet*. The insects will quickly fall, and should be killed immediately. This should be repeated daily for a week, or so long as the insects continue to make their appearance. Repeated trials have proved, beyond question, that this rather tedious mode is a very effectual one, if persisted in. Coops of chickens placed about under the trees at this

season will assist in destroying the insects.

2. "*Gathering the fruit and destroying the larvæ.* As the insect, in its larvæ or grub form, is yet within the plums when they fall prematurely from the tree, it is a very obvious mode of exterminating the next year's brood to gather these fallen fruits, daily, and feed them to swine, boil, or otherwise destroy them. In our own garden, where several years ago we suffered by the Plum-Weevil, we have found that this practice, pursued for a couple of seasons, has been pretty effectual. Others have reported less favourably of it; but this, we think, arose from their trying it too short a time, in a soil and neighbourhood where the insect is very abundant, and where it consequently had sought extensively other kinds of fruit besides the plum.

"A more simple and easy way of covering the difficulty, where there is a plum orchard or enclosure, is that of turning in swine and fowls during the whole season, when the stung plums are dropping to the ground. The fruit, and the insects contained in it, will thus be devoured together. This is an excellent expedient for the farmer, who bestows his time grudgingly on the cares of the garden.

3. "*The use of salt.* A good deal of attention has lately been drawn to the use of common salt, as a remedy for the Curculio. Trials have been made with this substance in various parts of the country, where scarcely a ripe plum was formerly obtained, with the most complete success. On the other hand, some persons, after testing it, have pronounced it of no value. Our own experience is greatly in favour of its use. We believe that, properly applied, it is an effectual remedy against the Curculio, while it also promotes the growth of the tree, and keeps the soil in that state most congenial to its productiveness. The failures that have arisen in its use, have, doubtless, grown out of an imperfect application, either in regard to the quantity or the time of applying it.

"In the directions usually given, it seems only considered necessary to apply salt, pretty plentifully, at any season. If the soil be thoroughly saturated with salt, it is probable that it would destroy insects therein, in any

stage of their growth. But, though the plum tree seems fond of saline matter, (and one of the most successful experimenters applied strong fish brine, at the rate of three or four pails full to a tree of moderate size,) it must be confessed this is a somewhat dangerous mode, as the roots are forced to receive a large supply of so powerful an agent at once.

"The best method of applying salt against the Plum-Weevil is that of strewing it pretty thickly over the surface, *when the punctured plums commence dropping*. The surface of the ground should be made smooth and hard, and fine packing salt may then be evenly spread over it, as far as the branches extend, and about a fourth of an inch in depth. Should the weather be fine, this coat will last until the fruit infected has all fallen; should it be dissolved or carried off by showers, it must be replaced directly. The larvæ or grubs of the Weevil, in this most tender state, emerging from the plum to enter the ground, will fall a prey to the effect of the salt before they are able to reach the soil. If this is carefully and generally practised, we have little doubt of its finally ridding the cultivator of this troublesome enemy, even in the worst districts and soils."

C. cupreus. Copper-coloured Weevil. Attacks the leaves and young shoots of the plum and apricot, as well as their fruit. June and July.

C. bacchus. Purple or Apple Weevil. Pierces the fruit of the apple, depositing within it its eggs. June and July.

"*C. sulcatus*. Colour, dull black. Attacks the shoots and leaves of vines in hot-houses in January, and those on walls at the end of May or June. It will also eat the leaves and fruit of the peach. It deposits its eggs just below the surface of the soil, and these not only injure the roots of the vine, but those of the sedum, saxifrage, trolius, auricula, and primrose, detaching the roots from the crowns."—*Gard. Chron.* See a fuller description of this insect under its modern name of *Otyorhincus*.

C. alliariae. Stem-boring Weevil. Steel-green colour. Bores the shoots and grafts of young fruit trees. Appears in June and July.

C. pomorum. Apple Weevil. Colour, dark brown. Attacks the blossom of the apple, and often destroys the whole

crop. More rarely it attacks the pear blossom. Appears in March and April.

C. pyri. Pear Weevil. Dark brown, very like the apple weevil. April.

C. oblongus. Oblong Weevil. Reddish-brown colour. Feeds on the young leaves of the peach, apricot, plum, pear, and apple. Appears in May.

C. pleurostigma. See *Ambury*.

C. lineatus. Striped Pea Weevil. Ochreous colour, and striped. Appears in March and April.

C. macularius. Spotted Weevil. Gray colour. April. Also destroys the pea. Soot or lime sprinkled over peas early in the morning before the dew is off from them, and so thickly as to cover the soil about them, would probably save them. To mitigate the attack of the weevils upon trees, the only mode is to spread a sheet beneath them, to shake each branch, and to destroy those beetles which fall. They usually feed at night.

C. nucum. Nut Weevil, of which the maggot is so frequent in our filberts. Mr. Curtis thus describes it:—"The insect is brown, with darker bands; is about a quarter of an inch long, and has a long horny beak, about the middle of which are placed antennæ. When the nut is in a young state the female weevil deposits a single egg. The maggot is hatched in about a fortnight, and continues feeding in the interior of the nut till it is full grown. The nut falls when the maggot has no legs, nor, indeed, has it any use for them, being hatched in the midst of its food; and when the nut remains on the tree, it forces itself out of the hole it eats in the nut, and falls almost immediately to the ground. The only remedy we are aware of is, in the course of the summer to frequently shake the trees, which will cause all the eaten nuts to fall to the ground, when they must be collected and burned."—*Gard. Chron.*

C. picipes is a dull black, and is very injurious in the vinery.

C. tenebricosus infests the apricot. Mr. Curtis says, that "every crevice in old garden-walls often swarms with these weevils; and nothing would prove a greater check to their increase than stopping all crevices or holes in walls with mortar, plaster of Paris, or Roman cement, and the interior of hot-houses should be annually washed with lime; the old bark of the vines under which

they lurk, should be stripped off early in the spring, and the roots examined in October, when they exhibit any unhealthy symptoms from the attacks of the maggots of *C. sulcatus*.

"When the larvæ are ascertained to reside at the base of the wall, salt might be freely sprinkled, which will kill them as readily as it will the maggots in nuts; strong infusions of tobacco-water, aloes, and quassia, are also recommended."—*Gard. Chron.*

CURCUMA. Twenty-one species. Stove herbaceous perennials. From *C. longa* turmeric is obtained. Offsets. Rich light soil.

CURL. A disease of the potato. "Any one can ensure the occurrence of this disease by keeping the sets in a situation favourable to their vegetation, as in a warm damp outhouse, and then rubbing off repeatedly the long shoots they have thrown out. Sets that have been so treated I have invariably found produce curled plants. Is not the reason very apparent? The vital energy had been weakened by the repeated efforts to vegetate; so that when planted in the soil, their energy was unequal to the perfect development of the parts; for the curl is nothing more or less than a distorted or incomplete formation of the foliage, preceded by an imperfect production of the fibrous roots.

"The variety employed was the Early Shaw. An equal number of whole moderately-sized potatoes, that had been treated in three different modes, were planted the last week of March.

"No. 1. Twenty sets that had been carefully kept cold and dry throughout the winter, firm, unshrivelled, and with scarcely any symptoms of vegetation.

"No. 2. Twenty sets that had been kept warm and moist, and from which the shoots, after attaining a length of six inches, had been thrice removed.

"No. 3. Twenty sets that had been kept warm and moist for about half the time that No. 2 had, and from which the shoots, three inches in length, had been removed only twice.

"All the sets were planted the same morning, each exactly six inches below the surface, and each with an unsprouted eye upwards. The spring was genial.

"Of No. 1, nineteen plants came up. The twentieth seemed to have been removed by an accident. Of the nineteen

not one was curled. The produce, a full average crop.

"Of No. 2 all came up, but from ten to fourteen days later than those of No. 1, and three of the plants sixteen days later. Fourteen of the plants were curled.

"Of No. 3 all came up, but from ten to fourteen days later than those of No. 1. Four plants were as severely curled as those in No. 2, eight were less so, and the remainder not at all; but of these the produce was below an average, and a full fortnight later in ripening.

"Dickson, Crichton, Knight, and others, have found that tubers taken up before they are fully ripened, produce plants not so liable to the curl as those that have remained in the ground until completely perfected; and I believe under ordinary treatment this to be the fact, for it is rational. The process of ripening proceeds in the potato, as in the apple, after it has been gathered; and until that is perfected it is accumulating vigour, shows no appetency to vegetate, consequently is not exhausting its vitality, which is a great point, considering the careless mode usually adopted to store them through the winter; for this energy commences its decline from the moment it begins to develop the parts of the future plant. Tubers taken from the soil before perfectly ripe, never are so early in showing symptoms of vegetation. Crichton, Hunter, and Young, in some of the works before referred to, have also agreed, that exposing the sets to light and air, allowing them to become dry and shrivelled, also induces the curl in the plants arising from them. This result of experience also confirms my conclusion, that the disease arises from deficient vital energy; for no process, more than this drying one of exposure to the light and air, tends to take away from a tuber the power of vegetating altogether.

"Every one acquainted with the cultivation of the potato, is aware of the great difference existing in the varieties; as to their early and rapid vegetation, those that excel in this quality are of course the most easily excitable. A consequence of this is, that they are always planted earliest in the spring, before their vital power has become very active; and of all crops, practice demonstrates that these early ones are least liable to the curl. But what is

the consequence, on the contrary, if an early variety is planted for a main crop later in the spring, when extraordinary pains in keeping them cold and dry have not been employed to check their vegetation, and consequent decrease of vital energy? Such crop, then, is more than any other liable to the disease, and a good preventive has been suggested by Dr. Lindley, namely, that of planting the tubers in autumn, immediately after they have ripened. The results of my view of the disease, sustained by numerous experiments, are, that it will never occur if the following points are attended to:—First, that the sets are from tubers that exhibit scarcely any symptoms of incipient vegetation; to effect which they ought, throughout the winter, to be preserved as cool and as much excluded from the air as possible. Secondly, that the tubers should be perfectly ripened. Thirdly, that they should be planted immediately after they are cut. Fourthly, that the manure applied should be spread regularly, and mixed with the soil, and not along a trench in immediate contact with the sets. Fifthly, that the crop is not raised for several successive years on the same area.”—*Principles of Gardening*.

CURRENT. (*Ribes*.)

Black Currant. (R. nigrum.)

1. Black Grape.
2. Black Naples, largest and best.
3. Common Black.
4. Russian Green.

Red Currant. (R. rubrum.)

1. Common Red.
2. Red Dutch, large and good.
3. Knight's Large Red, largest.
4. Knight's Sweet Red, large, and not so acid as other red varieties.
5. Knight's Early Red.
6. Champagne.
7. Striped-fruited—berries marked with red and white stripes.
8. Striped-leaved.
9. Rock Currant.

White Currant. (R. album.)

1. Common White.
2. White Dutch, largest and best.
3. Pearl White.
4. Speary's White.

Soil.—Any fertile garden soil suits them.

Propagation.—*By Cuttings*.—The best shoots for propagating from are those that are fully ripened, and not too

strong. They are first to be deprived of about two or three inches of the point, and cut into lengths of ten inches or a foot, according to the size and strength of the shoots.

Then, with a sharp knife, divest each shoot of the whole of its buds, excepting three or four nearest the top of the cutting, which must be left to form the branches of the future plant.

Rubbing off the buds is not sufficient; they require to be picked out, or pared very close, to prevent them from throwing up suckers, which materially affect the growth of the plants, and rob the fruiting branches of most of their nourishment, when not displaced in proper time. The small buds towards the base of the cutting are always the most troublesome in this respect, and great care should be taken to remove them effectually before the cutting is inserted in the ground.

Immediately underneath the part which the lowest bud occupied make a clean horizontal cut, without displacing any portion of the bark, and the cutting is then complete.

A small spot is next to be dug and got ready for them, and if it can be obtained in a situation that is rather shaded than otherwise, so much the better.

The cuttings are then to be inserted in rows a foot apart, six or eight inches asunder, and two or three inches deep, and the earth firmly pressed around them, either with the hand, or by placing one foot on each side of the row, and treading it from one end to the other.—*Gard. Chron.*

Observe, those designed for common standards should be trained up to a twelve or fifteen inch stem, then encourage them to branch out all round at that height to form a full head, for if suffered to branch away immediately from the bottom, they overspread the ground, that no crops can grow near them, as well as appear unsightly, and render it inconvenient to do the necessary work—thin the branches to moderate distances.

By Suckers.—All the sorts are too apt to send up suckers from the roots; each sucker forming a proper plant is the most expeditious mode of propagating. They may be taken up in autumn, winter, or spring, with roots, or even such as are without fibres will

succeed; planting them either in nursery-rows for a year or two, or such as are tall and strong may be planted at once, where they are to remain, observing to train the whole for the purposes intended, as directed for the cuttings, and they will form bearing plants after one or two years' growth.

The propagating by suckers is by some objected to, alleging they incline to run greatly to suckers again: there is, however, but little foundation in this, for it is peculiar to these shrubs, let them be raised either by seeds, cuttings, or any other method.

By Layers.—The young branches being laid in autumn, winter, or spring, will readily strike root, and next autumn be fit to transplant.

In the general propagation of these shrubs we would observe, that as they naturally throw out many suckers from the root, so as often to become troublesome, it is proper, previous to planting the cuttings and suckers, &c., to rub off close all the buds or prominent eyes from the lower part, as far as they are to be put into the ground, which will in some measure diminish their tendency in the production of suckers; likewise, when transplanting the young plants, if they discover any tendency to the production of suckers, let all such parts be also carefully rubbed off close.—*Abercrombie.*

Grafting.—An anonymous writer in the *Gardener's Chronicle* observes, that "standard currants have a pretty appearance, and this is increased if they are grafted with opposite colours, such as black and white, and red, or red and white. Allow the stock to reach four feet in height, then let it be stopped so as to make a bushy compact head.

"For standards or espaliers, train either horizontally or by the fan method, about six shoots or more, according to the space you wish to cover on either side, leaving one for the centre to be grafted. Train the same number of shoots of the worked variety. Each leading shoot, if kept and spurred in, will bear abundantly, and the fruit will also be of finer quality, and of a sweeter flavour, by being fully exposed to the sun and air, which is better attained by this method than if the plants were grown in the usual way.

Training as Espaliers.—Mr. Snow, gardener at Swinton Gardens, for this

purpose gives the following directions: "Procure stakes four feet in length, and three or three and a half inches in circumference. To these, disposed after this manner, XXXX, train the trees in the fan method, and tie the shoots to the stakes with matting. Independent of being secure from the wind, there are other advantages to be gained by this mode of training; the space taken up is less, the pruning is more easily performed, and the whole surface is regularly exposed to the action of the sun and air. The wood is also equally and properly ripened, and better crops of well-flavoured fruit ensue.

"By this means the late kinds are likewise much more easily and more securely protected from the depredation of birds and wasps, and from injury by frost or wet.

"A single mat thrown over the bushes is sufficient to preserve the fruit until Christmas, or later. And moreover, by this system the trees in matting up are not disfigured or crushed, the wet is more effectually kept off, as it does not fall on the mat and soak through to the fruit; but from no flat surface being presented the rain runs off the mat as it falls; the fruit is kept perfectly dry, and there is little or no injury done to the mat. The stakes never want renewing, as the bushes, when once in a regular shape, support themselves."—*Gard. Chron.*

After-Culture.—"Never allow the branches to be too crowded, or to interfere with one another. The shoots which spring up in the centre are to be cut away very close, as well as the small shoots on the main branches, leaving only the external one, which must be shortened for about a third of its length. If this is done, the bush will have the form of a cup, with the branches ranged regularly round the stem. Red and white currants require the same treatment, as they produce their fruit on spurs. The black currant must be managed differently, as it bears chiefly on the shoots of the preceding year. Instead, therefore, of spurring and otherwise shortening the branches, all that is necessary is to thin them, and keep the bushes compact."—*Gard. Chron.*

Forcing.—Red and white currants may be in our desserts during nine months of the twelve. Pot some three-

year-old plants during the first week of January, and place half of them in the peach-house, and the other moiety on the upper shelf of the green-house. The first will come into bearing early in April, and the remainder at the end of May. The open ground crop is fit for gathering before June closes, and some of these, if matted over at the end of July, may be kept good until December terminates.

CURRENT SPHINX. See *Sphinx*.

CURT GYNE. Three species. Green-house evergreen shrubs. Cuttings, put for a few days in the sun. Sandy loam.

CUSONIA. Three species. Green-house evergreen shrubs. Cuttings. Peat and loam.

CUSTARD APPLE. *Anona*.

CUTTING is a part of a plant capable of emitting roots, and of becoming an individual similar to its parent. The circumstances requisite to effect this are a suitable temperature and degree of moisture.

Cuttings in general may be taken either from the stem, branch, or root; and are, in fact, grafts, which by being placed in the earth, a medium favourable to the production of roots these emit, instead of aiding the stock to effect that development of vessels necessary for their union to it, had they been grafted. A due degree of moisture in the soil is absolutely required from it by cuttings, for these will often produce roots if placed in water only. The time for taking off cuttings from the parent plant for propagation, is when the sap is in full activity; the vital energy in all its parts is then most potent for the development of the new organs their altered circumstances require. Well-matured buds are found to emit roots most successfully, and apparently for the same reason that they are least liable to failure, when employed for budding, viz., that being less easily excitable, they do not begin to develop until the cutting has the power to afford a due supply of sap. Therefore, in taking a cutting, it is advisable to remove a portion of the wood having on it a bud, or joint, as it is popularly called, of the previous year's production. Many plants can be multiplied by cuttings with the greatest difficulty, and after every care has been taken to secure to the cutting every circumstance

favourable to the developement of roots.

Those plants which vegetate rapidly, and delight in either a moist or rich soil, are those which are propagated most readily by this mode, and such plants are the willow, gooseberry and pelargonium; a budded section of these can hardly be thrust into the ground without its rooting.

Cuttings of those plants which grow tardily, or in other words form new parts slowly, are those which are most liable to fail. These are strikingly instanced in the heaths, the orange, and ceratonia.

A rooted cutting is not a new plant, it is only an extension of the parent, gifted with precisely the same habits, and delighting most in exactly the same degree of heat, light and moisture, and in the same food.

A cutting produces roots, either from a bud or eye, or from a callus resembling a protuberant lip, which forms from the alburnum between the wood and the bark round the face of the cut which divided the slip from the parent stem. If the atmospheric temperature is so high that moisture is emitted from the leaves faster than it is supplied, they droop or flag, and the growth of the plant is suspended. If a cutting be placed in water, it imbibes at first more rapidly than a rooted plant of the same size, though this power rapidly decreases; but if planted in the earth, it at no time imbibes so fast as the rooted plant, provided the soil is similarly moist; and this evidently because it has not such an extensive imbibing surface as is possessed by the rooted plant; consequently, the soil in which a cutting is placed should be much more moist than is beneficial to a rooted plant of the same species, and evaporation from the leaves should be checked by covering the cuttings with a bell-glass, or a Wardian case would be still better. The temperature to which the leaves are exposed should be approaching the lowest the plant will endure. The warmer the soil within the range of temperature most suitable to the plant, the more active are the roots, and the more energetically are carried on all the processes of the vessels buried beneath the surface of the soil; 50° for the atmosphere, and between 65° and 75° for the bottom heat, are the most effectual temperatures

for the generality of plants. The cutting should be as short as possible consistently with the object in view. Three or four leaves, or even two, if the cutting be very short, are abundant. They elaborate the sap quite as fast as required, and are not liable to exhaust the cutting by super-exhalation of moisture.

Cuttings taken from the upper branches of a plant, flower and bear fruit the earliest, but those taken from near the soil are said to root most freely. Cuttings which reluctantly emit roots may be aided by ringing. The ring should be cut round the branch a few weeks before the cutting has to be removed; the bark should be completely removed down to the wood, and the section dividing the cutting from the parent be made between the ring and the parent stem, as soon as a callus appears round the upper edge of the ring.

The soil is an important consideration. The cuttings of orange trees and others which strike with difficulty if inserted in the middle of the earth of a pot, do so readily if placed in contact with its side. The same effect is produced by the end of the cutting touching an under drainage of gravel or broken pots. Why is this? My observations justify me in concluding that it is because in these situations, the side and the open drainage of the pot, the atmospheric air gains a salutary access. A light porous soil, or even sand, which admits air the most readily, is the best for cuttings; and so is a shallow pan rather than a flower pot, and apparently for the same reason. I have no doubt that numerous perforations in the bottom of the cutting pan would be found advantageous for cuttings which root slowly.

Some plants may be successfully propagated by means of the leaves, and among those whose numbers are thus most commonly increased, are the *Cacti*, *Gesneræ*, *Gloxiniæ*, and other fleshy leaved plants. Lately the suggestion has been revived,—a suggestion first made by Agricola at the commencement of the last century. He states that M. Manderola had raised a lemon-tree in this mode; and thence concludes, rather too rashly, that all exotic leaves may at any time be converted into trees. Since that was written, in 1721, it is certain that plants have been raised from leaves that previously had

been considered totally incapable of such extension. Thus M. Neumann has succeeded with the *Theophrasta latifolia*; and going a step further, he has even bisected a leaf, and raised a leaf from each half.

Mr. Knight has also recorded in the *Horticultural Transactions* of 1822, that leaves of the peppermint (*Mentha piperita*), without any portion of the stem upon which they had grown, lived for more than twelve months, increased in size, nearly assumed the character of evergreen trees, and emitted a mass of roots. That leaves may be made almost universally to emit roots there appears little reason to doubt; for the same great physiologist had long before proved that the roots of trees are generated from vessels passing from the leaves through the bark; and that they never in any instance spring from the alburnum. But the question arises, will they produce buds? and at present the answer derived from practice is in the negative; orange leaves, rose leaves, leaves of *Statice arborea*, have been made to root abundantly; but like blind cabbage plants, they obstinately refused to produce buds.

Dr. Lindley thinks that a more abundant supply of richer food, and exposure to a greater intensity of light, would have removed this deficiency; and I see every reason for concurring with so excellent an authority; for buds seem to spring from the central vessels of plants, and these vessels are never absent from a leaf. If an abundant supply of food were given to a well-rooted leaf, and it were cut down close to the callus, from whence the roots are emitted, I think buds would be produced, for the very roots themselves have the same power.

In general, the young wood strikes most readily. Those of the *Semecarpus mahogani*, *Swietenia mahogani*, *Euphorbia litchi*, and others, must have the wood quite soft, and must be inserted in the soil under bell-glasses the moment they are cut. On the contrary, cuttings of milky, gummy or resinous plants, such as *Araucaria*, *Euphorbia*, and *Vahea gummiifera*, require to be buried in damp sand for twenty-four hours, with the wound exposed, and then to be planted, after having the exuded matter washed off with a sponge. Herbaceous plants having a partial de-

velopment of wood, as the *Pelargonium*, *Calceolaria*, and *Cineraria*, will strike in any place shaded from the meridian sun. Cuttings of fleshy-leaved plants, as the *Cacti*, and many others, root better after being allowed to remain for forty-eight hours, after division from the parent plant, before they are planted. Diosmas, fuchsias, heaths, camellias, &c., require for their cuttings the gentle heat of a nearly exhausted hot-bed, and a close atmosphere, with but little light admitted night and morning. The bell-glasses employed should be proportioned to the size of the cutting. A small cutting should not be placed under a large glass. Blue and violet-coloured glass is found most favourable for the purpose, and this is accounted for by the fact, that glass of this colour admits very few luminous or leaf-stimulating rays of light; but nearly all the chemical rays of the spectrum, which assist in the decomposition of bodies. M. Neumann has succeeded in striking cuttings of monocotyledonous plants, such as *Draycena*, *Freyenettia*, and *Vanilla*. The cuttings may be from branches of any age between less than one and six years old. They require to have the leaves cut away at the bottom of the cutting, the whole length of the portion to be buried. It is not necessary to use the extremities of branches, pieces from their middles answer as well. M. Neumann also thinks that all dicotyledonous plants may be multiplied by cuttings of their roots, or even by detached leaves. *Dais cotinifolia* is increased from cuttings of the roots, and so is *Paulownia imperialis*. Pieces two inches long, and half an inch in diameter, and cut in March, root well. *Maclaura aurantiaca* succeeds similarly even in the open air, the upper wound of the cutting being placed nearly level with the surface. He has also multiplied *Araucaria Cunninghamii*, and all the *Coniferae*, by root cuttings.

Soil.—The soil most generally applicable, is that which is rich and light. Some cuttings, as those of the *Tamarix elegans* and *T. germanica*, require a little saltpetre in the soil.

CYAMOPSIS *psoraloides*. Hardy annual. Seeds. Common soil.

CYANELLA. Five species. Green-house bulbous perennials. Offsets. Sandy loam and peat.

CYANOTIS. Three species. Green-house biennials. Seeds. Rich mould. *C. barbata* is a hardy herbaceous perennial. Increased by division.

CYATHEA. Two species. Stove evergreen ferns. Division or seeds. Peat and loam.

CYATHODES. Three species. Green-house evergreen shrubs. Cuttings. Peat and loam.

CYCAS. Five species. Stove herbaceous perennials. Suckers. Rich loam.

CYCLAMEN. Ten species, and many varieties. Hardy or green-house tuberous-rooted perennials. Seeds. Sandy loam and vegetable mould. Species most worthy of culture are—

C. Coum. Round-leaved, spring-flowering sowbread. Reddish purple. January to March.

C. Europæum. Round-leaved, summer-flowering sowbread. Reddish purple. Fragrant. July to September.

C. vernal. Round-leaved winter-flowering sowbread. Like preceding. November to January.

C. Persicum. Persian sowbread. Various colours. February to May.

C. Neapolitanum. Neapolitan sowbread. Rosy. August to September.

C. hederacfolium. Ivy-leaved sowbread. White and pink. Fragrant. March to May.

Mr. G. Gordon, of the Chiswick Gardens, gives the following excellent directions for their culture:—

“The Cyclamen is increased by cutting the largest roots in pieces, which is a bad practice, as they are very liable to rot during the first season after cutting, or while in a dormant state, unless the parts are kept very dry, a thing very injurious to the early flowering kinds.

“By Seeds, which should be sown when ripe, whether it be autumn or spring, in pans or pots well drained, and filled with a mixture of equal parts of sandy loam and leaf-mould, to which should be added a small portion of well-rotted dung. Then place the pans or pots in a cold frame or pit, kept close, if sown in the spring; but if sown in the autumn, they should be placed on the back shelf of the green-house, and kept rather dry during the winter, and gradually watered more as the spring advances.

“The autumn-sown plants will be fit

for transplanting about the end of May, or beginning of June following, if properly treated; whilst those sown in the spring should not be removed from the seed-pans before the following spring; they will by that time have formed roots about the size of a hazel-nut. Prepare then some large pots or pans, well drain, and fill them with the same kind of soil as that in which these seeds were sown, and transplant the young roots from the seed pans into these, placing them about three or four inches apart according to the size of the roots. Return them to the cold pit or frame, and keep them close until they begin to grow; afterwards admit air freely by day, but keep the pit close at night, till the beginning of July, when the pots or pans should be plunged, and the plants fully exposed, both day and night; taking care, however, that the soil in the pots does not get sodden with too much rain, or become too dry. They will require no more trouble, except keeping free from weeds and slugs, till the middle of September, when they should be potted singly into small forty-eight sized or sixty pots, (according to the size of the roots,) filled with the same kind of soil as that previously used.

"In potting, the bulbs should never be entirely covered with the soil, but about one-third left exposed. When potted, they should be placed on the back shelf of the green-house, or in a cold pit, where they can be kept dry and free from frost, until they begin to grow. If they are the early flowering kinds, a few may be placed in the window of the sitting-room, and but sparingly watered until they commence growing, when they should have a more liberal supply.

"The roots will begin to bloom the second season, and may be placed on the shelves of the green-house; or if they are of those hardy kinds which flower in summer or autumn, the pots may be plunged in the open border. When done flowering they should be returned to the cold pit or frame, where the lights must be kept on during the night, in cold or wet weather; but where they can have plenty of air at all times, observing as they cease growing, that water should be withheld, and finally, the roots gradually dried. The roots, when dry, should be allowed to

remain in the pots, and not be shaken out, as is frequently done; for when taken out of the soil they are almost sure to get too much dried before they are again potted. This is particularly the case with the early flowering sorts.

"The proper time of the year for resting the flowering roots, entirely depends on the sorts. *C. Persicum* will be at rest when the *C. Europæum* and *C. Neapolitanum* will be in full bloom, and vice versâ. The roots should be shaken from the soil, and repotted directly the least sign of vegetation is observable. But the early spring-flowering kinds may be forced earlier into bloom by potting a few of the strongest roots sooner, and placing them in a warm dry place. They must not be excited too rapidly, or watered freely; for if they are, the leaves are almost sure to damp off during the dull winter months, and particularly those of the beautiful *C. Persicum* and its varieties."—*Gard. Chron.*

CYCLANTHUS plumieri. Curious stove herbaceous perennial. Suckers. Loam and peat.

CYCLOBOTHR. Five species. Hardy, half-hardy, or green-house bulbous perennials. Bulbs. Peat, loam and sand.

CYDONIA. Three species, and four varieties. Hardy deciduous fruit trees or shrubs. Suckers. Any soil suits them. *C. vulgaris*, the quince.

CYLINDROSPORIUM concentricum. A parasitical fungus often attacking the cabbage, forming a blight or mildew. Repeated syringing with water in which three ounces per gallon of salt have been dissolved, will remove it.

CYLISTA. Four species. Stove evergreen climbers. Cuttings. Loam and peat.

CYMBIDIUM. Seventeen species. Stove orchids. Division. The terrestrial kinds, loam and peat. The epiphytal, wood.

CYMBOPOGON Schœnanthus. A stove species of grass. Seeds. Loam and peat.

CYNOCHE pentadactylum. Stove epiphyte. Offsets. Fibrous peat.

CYNOGLOSSUM. Twenty-two species. Hardy annuals, biennials, or herbaceous perennials. Division. Common soil.

CYPELLA. Two species. Green-

ouse bulbous perennials. Offsets. Sandy peat.

CYPIIIA. Five species. Green-house annuals. Seeds. Common soil. *C. phyteuma* is a tuberous-rooted, and *C. cardamines* a stove herbaceous perennial. Young shoots. Peat, loam and sand.

CYPRESS. *Cupressus*.

CYNARA. (See *Cardoon* and *Artichoke*.) Eight species. Chiefly hardy herbaceous perennials. Seeds. Good rich soil.

CYNIPS. Gall-fly. The species of this genus chiefly confine their attacks to the oak and other timber trees. The species chiefly noticeable by the gardener is the *C. rosæ*, which causes the hairy galls occasionally observed upon rose trees.

CYPRIPEDIUM. Lady's slipper. Twelve species, and variety. Chiefly hardy terrestrial orchids. Division. Sandy peat.

An anonymous writer gives the following correct directions for their cultivation:—

"The sorts in general cultivation are, *Cypripedium venustum* (purple and green); *purpuratum* (purple); *insigne* (green and purple); *humile* (purple and white); *guttatum* (yellow); *ventricosum* (dark purple); and our own pretty native species, *Calceolus* (yellow).

"Of these the three first are from warm latitudes, and consequently require the temperature of a stove; the remaining sorts come principally from North America, and are either hardy, or require but a moderate protection during the winter and spring.

"The stove kinds are found to succeed tolerably well by being potted in soil composed of rotten wood, moss, and a little silver sand; while the hardier kinds thrive best when planted in a shady situation in sandy peat.

"The American varieties require a protection of straw, or some other material, to preserve them from the effects of severe frosts, and to throw off the rain in wet seasons.

"At Messrs. Rollison's, of Tooting, they succeed remarkably well in a peat border adjoining the back wall of a heath house, being covered during the winter and spring months with sphagnum to the depth of two or three inches. Another successful method of treating them, is to pot them in good sized pots,

in a mixture of sandy peat and rotten saw-dust, keeping them in a cool green-house or frame.

"They are difficult of increase. They may sometimes be propagated by division of the roots; this, however, occurs but rarely. Occasionally, in favourable situations, they will perfect seeds; especially, if care is taken, when the flowers are in a proper state, to apply the pollen to the stigma with a camel hair pencil.

"As they are plants which thrive only in shady situations, where the rays of the sun do not penetrate with sufficient power to cause a speedy evaporation, but little moisture will be necessary even during the summer, particularly if the soil be protected with a covering of moss; and during their period of rest in the autumnal and winter months, water may be entirely dispensed with."—*Gard. Chron.*

CYRILLA. Two species. Green-house evergreen shrubs. Cuttings. Sandy loam and peat.

CYRTANTHUS. Nine species. Green-house bulbous perennials. Offsets. Turfy loam, sand and peat.

CYRTOCHILUM. Four species. Stove orchids. Division. Wood, with moss on the roots.

CYRTOPERA *Woodfordii*. Stove orchid. Division. Wood.

CYRTOPODIUM. Three species. Stove orchids. Division. Wood.

CYTISUS. Forty-one species, and some varieties. Chiefly hardy deciduous shrubs and trees, with a few green-house evergreens. Seeds, layers, grafts, or buds. Any soil suits them.

CZACHIA *liliastrum*. Hardy herbaceous perennial. Seeds or division. Good rich loam.

DACRYDIUM. Two species. Green-house evergreen trees. Cuttings. Sandy loam and peat.

DACTYLICAPUOS *thalictrifolia*. Half-hardy evergreen climber. Seeds. Sandy soil.

DÆMIA. Four species. Stove evergreen twiners. Cuttings. Sandy loam and peat.

DAFFODIL. *Narcissus pseudo-narcissus*.

DAHLIA. Seven species. Tuberous perennials. Cuttings, division, and seed. Rich sandy loam. The two species giving birth to the numerous lovely varieties of our gardens are *D. superflua* and *D. frustanea*.

Varieties.—These are numerous; so much so as in many instances to baffle the eye, in the attempt to discriminate between those which bear distinct names. The following, selected from the catalogue of D. Landreth & Fulton, Philadelphia, are admitted to be among the most desirable varieties.

Admiral Stopford, *Trentfield*, dark maroon, fine form.

Albion, *Cook*, bronzy salmon.

Alexander the Great, *Schmitz*, dark crimson.

Antagonist, *Bragg*, pure white, finely cupped.

Apollo, *Schmitz*, golden yellow, cupped petals.

Arethusa, *Brown*, violet purple.

Argo, *Widnall*, bright yellow, good form.

Argus, *Schmitz*, primrose yellow, tipped with rose.

Asmodeus, dark puce.

Beauty of Chelmsford, white and lavender.

Beauty of Philadelphia, *Schmitz*, yellow tipped with rose, fine form.

Bedford Surprise, rosy crimson, very fine.

Beeswing, *Drummond*, crimson.

Bermondsey Bee, purple, fine form.

Bloomsbury, *Lee*, bright crimson, superb form.

Bridal Ring, white and lavender.

Burnham Hero, *Church*, crimson, fine form.

Caleb Cope, *Schmitz*, mottled rose.

Cheltenham Queen, blush white.

Cleopatra, *Atwell*, light yellow.

Colonel Baker, claret, finely cupped.

Competitor, *Hodge*, dark rose.

Constantia, white, edge pink.

Conqueror, *Schmitz*, dark maroon, finely cupped.

Dazzle, dark scarlet.

Defiance, *Horwood*, rosy crimson.

Desdemona, *Schmitz*, primrose, beautifully cupped.

Dowager Lady Cooper, peach blossom, cupped.

Duchess of Richmond, orange and pink, fine.

Duke of York, *Keynes*, fine scarlet.

Emily, *Schmitz*, white edged with rose.

Enterprise, *Dodd*, clear buff.

Essex Triumph, *Turville*, dark maroon, fine form.

Eugenia, yellow, edge violet.

Eveque de Bayeaux, *Oudin*, maroon.

Exemia, *Girling*, bright rose, very showy flower.

Exquisite, white rosy edge.

Fire Ball, *Squibb*, vivid crimson, finely quilled.

Fire King, *Schmitz*, bright scarlet, very large.

Glory of Plymouth, *Rendle*, white tipped with purple.

Golden Souvenir, *Schmitz*, bright yellow, finely cupped.

Grandis, *Marshal*, fine rose.

Grand Bazaar, *Schmitz*, crimson and lilac.

Granta, *Widnall*, claret colour, fine.

Great Mogul, *Atwell*, shaded crimson, fine.

Henry Clay, *Schmitz*, dark claret, cupped, fine.

Hero of Stonehenge, *Whales*, dark claret, very fine.

Hero of Tippecanoe, *Hancock*, superb rose, finely cupped.

Hero of the West, *Schmitz*, rosy carmine, very large.

Hon. Miss Abbott, delicate lilac.

Hope, *Neville*, light rose, fine flower.

Horace Binney, *Schmitz*, shaded maroon, extra fine.

Indispensable, white, the best out.

Indian Chief, *Schmitz*, salmon.

Juliette, *Widnall*, rosy purple.

Juno, *Buist*, bronzy lilac.

King of Lilacs, very fine lilac.

King of Yellows, *Hislop*, light yellow, very fine.

Lady Antrobus, white, purple edge.

Lady Ashburton, *Russell*, blush white, edged with lilac.

Lady Bathurst, white laced with rose.

Lady St. Maur, white tipped with purple, superb flower.

Lady Sale, *Smith*, yellow edge rose.

La Tour de Auvergne, orange scarlet, finely cupped.

Le Grand Baudin, shaded crimson, fine form.

Lord Morpeth, puce, cupped.

Maid of Bath, *Davis*, white, purple edge.

Majestic, *Widnall*, shaded rose, profuse.

Marchioness of Exeter, blush, superb form, extra fine.

Marchioness of Ormonde, white tipped with purple, superb.

Mary Ann, *Schmitz*, pure white, finely cupped.

Marshal Soult, lilac and red.

Middlesex rival, dark rose.

Miranda, *Brown*, blush white, tipped with rose.

Miss Carpentier, *Schmitz*, mottled rose.

Miss Percival, *Schmitz*, pure white.

Mrs. Hibbert, *Schmitz*, blush rose, cupped petals.

Mrs. Jones, *Buist*, dove colour.

Mrs. Rushton, *Buist*, white tipped with rose, fine.

Mrs. Shelly, *Mitchell*, rose and lilac, beautiful flower.

Negro, *Schmitz*, dark maroon.

Ne Plus Ultra, *Widnall*, rich dark purple, cupped.

Nigra et Alba, *Girling*, white edged with purple.

Northern Beauty, *Robinson*, white tipped with rose, superb.

Nymph, *Schmitz*, yellow tipped with rose.

Ophir, *Edwards*, rich yellow, fine flower.

Orange Superb, orange, finely cupped.

Orb, *Widnall*, scarlet crimson, superb.

Pandora, *Bowman*, crimson, cupped petals.

Pickwick, purple, finely cupped.

Pocahontas, *Schmitz*, vermilion, large and fine.

Pontiac, *Schmitz*, orange edged with red, superb.

Prince Albert, *Adams*, light brown, cupped petals.

Princess Royale, *Hudson*, amber tipped with rose, fine.

Punch, *Dodd*, purple.

Queen, *Widnall*, peach blossom.*

Queen of Beauty, *Garth*, rich lilac, neat flower.

Queen of Roses, superb rosy lilac.

Queen of Trumps, white, lilac edge.

Quilled Perfection, very fine rose.

Reine des Fees, *Girling*, crimson and white.

Reliance, *Widnall*.

Rienzi, *Widnall*, crimson and puce.

Rising Sun, *Widnall*, dark crimson.

Roderick, *Schmitz*, rosy crimson.

Royal Standard, *Whales*, rosy purple, finely cupped.

Simon Snyder, *Schmitz*, large crimson.

Sir E. Antrobus, *Keynes*, fiery crimson.

Sir F. Johnston, *Hillier*, rosy crimson, superb flower.

Springfield Major, *Gaines*, dark crimson, cupped.

Standard of Perfection, *Keynes*, purple.

Striata Formosissima, white striped with rose.

Sunbury Hero, *Wilmer*, yellow tipped with red.

Sylph, *Widnall*, white edged with rose.

Thomas Clarkson, *Smith*, rosy purple.

Triumphant, *Schmitz*, white edged with lilac, fine.

Ultimatum, bright red.

Unique, *Ansell*, yellow tipped with red.

Victor, *Widnall*, yellow, tipped crimson.

Violet Perfection, *Keynes*, dark purple, fine flower.

Washington Irving, *Schmitz*, light purple.

Westbury Rival, *Hall*, deep crimson.

White Defiance, *Schmitz*, white, cupped petals.

Yellow Victory, *Schmitz*, fine yellow.

FANCY, OR VARIEGATED DAHLIAS.

Alba-purpurea Superba, *Bates*, purple tipped with white.

Beauty of England, *Girling*, purple tipped with white.

Charles XII., *Miller*, purple tipped with white.

Cinderella, *Dubras*, cherry tipped with white.

Donna Antoni, *Deelius*, rose tipped with white.

Eleame de Beaucour, *Girling*, white, purple edge.

Eveque de Tournay, purple tipped with white.

Fairy Queen, *Keynes*, fawn tipped with red.

Harlequin, *Dodd*, white tipped with bright scarlet, splendid flower.

Illuminator, *Keynes*, scarlet edged with white, fine fancy variety.

Le Lione, creamy white, edged with scarlet, fine.

Madam Chauvere, light rose tipped with white.

Madame Rignou, crimson, edged with white.

Madame de Schaunenfeld, *Girling*, dark rose tipped with white.

Madame Walner, *Girling*, maroon tipped with white.

Miss Funnell, purple tipped with white.

Nihil, red tipped with white.

Painted Lady, crimson tipped with white.

Silvio, *Dubras*, cherry red tipped with white.

Surprise, *Oakley*, purple, distinctly tipped with white.

Village Maid, purple, tipped with white.

Viscount Ressigueur, *Dubras*, purple tipped with white, large, full, superb flower.

"The dahlia is very variable, sporting from its true colours, but as often returning to them. Knowing this, let the following facts, with regard to new kinds of dahlias, be borne in mind before condemning them the second year:—

"1. That the seedling plant is much debilitated by propagation; and therefore the flowers are rarely as good the second season as they are the first and subsequent to the second.

"2. That the best flowers are obtained from those plants struck from the first cuttings produced by the mother-plant, notwithstanding that they are seldom as strong as the cuttings that are afterwards produced.

"3. The exciting the roots by means of a strong heat early in the spring, and striking the young plants in a strong dung-bed, tend to weaken the plants so treated to such a degree that they frequently require two or three seasons to recover and regain their original character. Thus it is found that good flowers are obtained with the least trouble from those plants kept in pots the first season after striking, (termed by the trade pot-roots,) planted out the following season, and allowed to start of their own accord.

"4. That in wet seasons manure is frequently very injurious from its causing the plant to grow too luxuriantly, and thus to produce but few flowers; while in very dry seasons it is equally injurious. Much more depends on a change of soil than on its composition and quality.

"5. That water is a point which cannot be too much attended to. A great difference exists between hard and soft water, but still more depends on the manner in which it is applied; for one or two good waterings are much better than a small quantity given three or four times a week.

"6. That taking up the roots immediately after a frost has destroyed the top, is the principal cause of so many

roots dying during the winter season."—*Gard. Chron.*

Propagation by Division.—"A good criterion for planting this root," says a writer in the *Gard. Mag.*, "is about the time of planting early potatoes for a first crop, but no sooner. They grow well in a rich light soil of almost any kind. In dividing the root, it is advisable to leave at least two eyes to each plant, cutting through the neck or crown. The spring is the most preferable time for dividing them, although some do it on taking them up in the autumn.

"Those who possess a hot-house should put each plant into a pot of six or eight inches in diameter, with some good rich mould, so as the crown may just appear at the top of the pot; then place them in the green-house, where they will soon make good plants: and when all danger from frost is over, they may be turned out into holes prepared for them. In this manner, after being so long confined, they will grow most luxuriantly.

"A common cucumber-frame may be successfully used in this way."—*Gard. Mag.*

By Grafting.—This is performed in the months of August, September, and October; and it is an excellent practice to avoid the chance of losing a seedling, or new or scarce varieties.

Fig. 33.



"It is, moreover, particularly applicable to those kinds which are horny-rooted and difficult to break; or such as 'Taylor's Sultana,' with long stringy tubers, which seldom live through the winter; and to others which break late. To all such this mode is recommended with the greatest confidence of success. The operation is exceedingly simple, (see figure 33), and may be performed at any time from January to December, (provided you have a good growing heat,) not only with young green shoots, but with others more advanced, if not hollow or pithy. The usual manner is to take a scion with six or eight leaves, cut it smooth below the joint, take off one of the lower leaves without injuring the eye, and then cut away a portion (half or three-quarters of an inch) of the skin or fleshy part of the wood between each of the lower eyes.

"Have ready a good sound piece of tuber of the last or present season (if ripe), in which make a slanting longitudinal incision of one or two inches, according to circumstances, and about half an inch wide at top, gradually tapering off to the bottom, and fix the scion firmly into it. The root should then be planted in a pot, with the grafted part just below the mould, and placed under a bell-glass, or in a warm close frame; but the former is best.

"In eight or ten days the union will be complete, and air may be gradually given. After a short time you will be able to head it down, either for cuttings, if in spring, or grafts for summer and autumn. It is advisable to leave at all times four eyes, to ensure a vigorous growth; and also to shift the plant into a larger pot occasionally."—*Gard. Chron.*

By Seed.—Mr. Sabine gives the following directions:—

"Collect the seed in September from dwarf plants and from semi-double flowers, when double varieties are chiefly desired. Perhaps seeds obtained from those particular florets of the disc which have altered their form, may have a greater tendency than others to produce plants with double flowers. Sow in March, heat of 55° or 65°; prick out, if necessary, in pots, and keep in a moderate temperature, say 50° or 55°, till the end of April. Plant out to remain, covering each plant at night with an empty pot for some weeks, to avoid injury from spring frosts to

themselves. Plant in rows three feet; two feet if in the flower-border. Plant in the back rows. They require to be staked. Seedlings thus treated will blow in July, and continue in perfection till the autumn."—*Hort. Transac.*

By cuttings.—"The shoots are allowed to grow until they have three pair of leaves, and they are cut off just under the second pair and above the lowest pair. Where one cutting is taken off plenty of others follow, and these are to be served the same way. There must be care used that the cuttings taken off are from three to four inches long, and that you leave a pair of leaves below; for at every leaf there is an embryo bud which will form a shoot, which shoot will in turn yield a cutting, and in two other embryo buds."—*Glenny: Gard. and Pract. Flor.*

"The cuttings, when taken off, may be struck the same as shoots, but they do not take root so rapidly. It must depend on the room you have whether you will plant a dozen cuttings round a forty-eight-sized pot, or put one cutting each into twelve small ones. In one case but little room is taken up while they are striking, and this is often of importance. When they have struck root they must be potted singly into sixty-sized pots, or thumb-pots, kept in heat a few days to establish them, and then be replaced under some kind of protection till planting them."—*Ibid.*

Propagation by eyes.—"In cases," adds Mr. Glenny, "where it is of great importance to increase a plant, they may be propagated by eyes, which will double the increase. In this case there may be half a dozen or more plants made out of one shoot, or seedling, taken off properly. Suppose there be three parts of leaves besides the end joint, the end joint, which will have two leaves, and the heart may be cut off close to the under leaves, which may be carefully removed; and thus forms a cutting. The stem left is to be split up, each half having the two or three leaves. These are to be cut close under each leaf. Half the portion of split stem, and the whole of the leaf, still remain, and these must be put an inch into the soil, each forty-eight-sized pot holding six, planted against the sides. The bud at the base of each leaf will make a plant if placed in a hot-bed; and when they have become well rooted

they may be placed in separate pots, and kept growing in heat until they are six or eight inches high, when they may be taken into a cooler frame."—*Gard. and Pract. Flor.*

Propagation from summer shoots.—"The most important operation in dahlia-growing," concludes Mr. Glenney, "is that of securing an increase from the shoots, which can be taken off after the plants have begun to grow in the open ground. These should be struck in the same way as other cuttings; but they must be selected carefully, cut as others are cut, close up to the under side of a pair of leaves, and be struck in a hot-bed in full perfection of heat."—*Ibid.*

"*The soil,*" says Mr. Glenney and other first-rate authorities, "cannot be too fresh; and of all soils that which produces good grass, as the top spade-full of a meadow, is the best. It should have a retentive yet well-drained subsoil, and be kept well supplied with moisture, not only by watering, but frequent hoeing.

"When the ground is poor, and has to be made more fertile, there is no addition equal to the soil formed by rotten turfs cut tolerably thick, which may be estimated at one-half loam and half vegetable mould; but this should be laid on in abundance, and will be far better than dung of any kind. Among the results of planting the dahlia in soil that is too rich, the principal one is that of remarkably vigorous growth, with little bloom, and that little bad."—*Ibid.*

"Holes in the situations where dahlias are to be planted," says Mr. Fintellmann, "are made fifteen inches in diameter and fifteen inches in depth, and filled with this soil; and in these holes, so filled, the young plants are turned out, or the old roots inserted. To retain the moisture, and protect the root from excessive heat, the surface is covered with moss.

"Liquid manure is applied two or three times in the course of the summer."—*Gard. Mag.*

After-culture.—This comprises chiefly staking, hoeing, protection, and slight pruning.

"Dahlias should never be pruned until the bloom buds show, and then but few branches should be cut out, and only such as are growing across others. The buds should be thinned,

for it is by these that the strength of the plant gets exhausted. By removing all that are too near one to be bloomed, and all those that show imperfections enough to prevent them being useful, much strength will be gained by the future flowers. So, also, by pulling off the blooms themselves, the moment they are past perfection, instead of letting them seed."—*Glenney: Gard. and Pract. Flor.*

"Winds and sun," adds an anonymous but correct writer, "are both detrimental; and the practice of fixing the blooms in the centre of a flat board, and covering them with glass or flower-pots as they may want light or shade, is becoming general. The more easy way is to use a paper-shade for any particular fine bloom; for however the flowers may be coaxed and nursed under cover, a stand of blooms grown finely and merely shaded from the hottest sun, will beat all others in brilliancy, and in standing carriage, and keeping. It is right to go round the plants, and, wherever there is a promising bud or bloom, to take away all the leaves and shoots that threaten to touch it as they grow; take off also the adjoining buds; and if the weather be windy make it fast to a stick or one of the stakes, that it may not be bruised or frayed; shade it from the broiling sun; and it will so profit by the air and night-dews, as compared with the bloom under pots and glasses, that if the growth be equal, the blooming will be superior. Nevertheless people will cover; and where there is a disposition to a hard eye, it will hardly come out perfect unless it is covered. As the end of September approaches, or as soon as you have done with the bloom, earth up the plants, that when the frost comes it may not reach the crown."—*Gard. and Pract. Florist.*

Preserving the Roots.—"The plants may be raised without injury," says Dr. Lindley, "immediately after the blooms are cut off by the frost, provided that they are hung up in a dry and ordinarily protected situation, with the roots uppermost, if care is taken to leave six or seven inches of the stem attached to each tuber; this may be done without the slightest fear of their withering from having been lifted in a green state. As the winter advances, and the tubers become matured and firm, the ordinary

modes of protection against frost may be resorted to."—*Gard. Chron.*

Protector.—The best devised shelter from the sun for the Dahlia is drawn and thus described in the *Gard. Chron.*

"This protector is made of wicker-work, and consists of an inverted shallow basket; to which is attached a tube made of the same material, through which the dahlia stick is passed; and a peg being inserted between the stick and the tube, it is firmly secured at any height required. It measures twelve inches in diameter, in the widest part, and is three and a half in depth. From its being made of so light a material, and from its simplicity of construction, it is not easily displaced or put out of order, and the flower not being confined within anything, is less liable to be damaged by coming in contact with any substance that would injure the petals. It requires to be painted to preserve it from decay, and if the outside be made green, and the inside white, the appearance of them would not be disagreeable, and the insects lurking inside would be easily perceived."

Forcing.—"The Dahlia may be advantageously forced by potting the roots in February, and letting them remain in frames till June; when they will begin to flower, and may be turned out into the open border."—*Gard. Mag.*

"To grow Dahlias in pots," says Dr. Lindley, "you must select the dwarf and more freely flowering kinds, the taller ones being totally unsuited for that purpose. After they are started, and when the shoots are about three or four inches long, pot them singly into small sixties in any light rich soil; water them freely, and place them in a hot-bed, keeping them close for a day or two, and shading them during sunshine. They will, if properly attended to, be rooted in about ten days, and should then be removed to a much cooler place, and have plenty of air. When established, shift them into larger pots, and finally, before placing them out of doors, repot them, either into twelves or eights, according to the size of your plants."

"Top the leading shoots to make them bushy; and when the danger of frost is over, they may be plunged in the open border, which saves much labour in watering; but even then they must be watered copiously in dry weather. They will flower freely all the

summer and autumn, although the blooms will not be so fine upon plants grown in pots as upon those in the open border. After flowering, cut the tops off, and place the pots containing the roots in a dry cellar, or other place, where they will be secure from frost during the winter. Young plants struck from cuttings flower much better in pots than the old roots."—*Gard. Chron.*

Exhibiting Stand.—Dr. Lindley says, "The dimensions of a Dahlia stand for twelve blooms should be twenty-two inches long by sixteen and a half wide, four in depth, and five and a quarter from tube to tube: sixteen and a half by eleven and a quarter will be the proportion for a stand of six. The surface of stands is generally painted a light green; a colour which shows the flowers off to the greatest advantage."—*Gard. Chron.*

DAISY. (*Bellis perennis*.) There are many double varieties of this hardy perennial; some white, others crimson, and many variegated. A more curious variety is the prolific and Hen and Chicken Daisy. They all will flourish in any moist soil, and almost in any situation. They bloom from April to June. Propagated by slips, the smallest fragment of root, almost, enables them to grow. To keep them double and fine, they require moving occasionally. Planted as an edging round the Ranunculus bed, their roots tempt the Wireworm from those of the choicer flower.

DALBERGIA. Nineteen species. Stove evergreen trees and climbers. Cuttings. Sandy loam and peat.

DALEA. Fifteen species, including hardy, stove, and green-house annuals and perennials. The latter by cuttings, and the annuals by seed, in a frame, to transplant to borders. Loam and peat.

DALECHAMPIA. Three species. Stove evergreen climbers. Cuttings. Loam and peat.

DALIBARDA *violaeoides*. Half-hardy herbaceous. Division. Common light soil.

DAMASCENE or **DAMSON.** See *Plum*.

DAMASONIUM. Two species. Tender aquatics. Division.

DAMMARA. Dammar pine tree. Two species. Cuttings. Sandy loam.

DAMPIERA. Two species. Green-house herbaceous. Cuttings. Peat and loam.

DAMPING OFF is a name applied by gardeners to an ulceration of the stems of seedlings, and other tender plants. This ulceration arises from the soil and air in which they are vegetating being kept too moist or damp. Flower seedlings are especially liable to be thus affected; and, to prevent this, one-third of the depth of the pot should be filled with small pebbles, and the soil employed, instead of being sifted, allowed to retain all moderately sized stones. The seeds should be sown very thinly, pressed down, and a little earth scattered over them. Mr. Ayres has well suggested that a little white sand be sprinkled over the surface, because this is not easily disturbed by watering, and is not a medium that retains moisture to the neck of the seedlings, where dampness most affects them. He adds, that a pot of sand should be kept hot upon a flue, and whenever symptoms of the disease appear, a little, whilst hot, sprinkled on the soil.

DANÆA alata. Stove fern. Division. Peat and loam.

DANCING-GIRLS. *Mantisia saltatoria.*

DAPHNE. Twenty-four species. Chiefly hardy or green-house evergreen shrubs, except *D. tinifolia*, which is a stove evergreen. Grafts on the Spurge Laurel. (*D. laureola.*) Peat.

DARLINGTONIA. Two species. Half-hardy herbaceous. Division or cuttings. Peat and sand.

DATE-PALM. *Phoenix.*

DATE-PLUM. *Diospyros.*

DATISCA. Two species. Hardy herbaceous. Division. Common soil.

DATURA. Nine species. Hardy annuals. Seeds. Common soil.

DAUBENTONIA. Two species. Stove evergreen shrubs. Cuttings. Sandy loam.

DAUBENYA. Two species. Green-house bulbs. Offsets. Sandy loam and peat.

DAUCUS. See *Carrot.*

DAVALLIA. Seven species. Green-house ferns. Division or seed. Peat and loam.

DAVIESIA. Eighteen species. Green-house evergreen shrubs. Cuttings. Loam, peat, and sand.

DAY LILY. *Heemerocallis.*

DECEMBER is a month in which the gardener is preparing chiefly for future

events—storing his edible roots—protecting his tender plants, and wheeling on stable manure to vacant ground.

The following work requires attending to:

KITCHEN GARDEN.

Artichokes, dress.—*Asparagus beds*, dress, b.; plant to force; attend that in forcing.—*Carrots*, dig up and store, b.—*Cauliflowers*, in frame, &c., attend to.—*Composts*, prepare and turn over.—*Dung*, prepare for hot-beds.—*Earth-ing-up*, attend to.—*Hot-beds*, attend to.—*Kidney Beans*, force, e.—*Leaves*, fallen, remove.—*Lettuces*, plant in hot-beds; attend to those advancing.—*Mint*, force.—*Mushroom-beds*, make; attend those in production.—*Parsnips*, dig up and store, b.—*Radishes*, sow, b.—*Small Salading*, sow in frames, &c.—*Spinach*, clear of weeds.—*Tansy*, force.—*Tarragon*, force.—*Trench*, drain, &c., vacant ground.

ORCHARD.

Apples, prune; plant.—*Apricots*, prune; plant.—*Cherries*, prune; plant.—*Composts* and fresh earth apply to poor or old borders.—*Currants*, prune; plant.—*Figs*, plant; protect from frost.—Fork over and dress the compartments generally.—*Gooseberries*, prune; plant.—*Mulch* round the roots and stems of trees newly planted, to exclude frost.—*Nectarines*, prune; plant.—*Pears*, prune; plant.—*Peaches*, prune; plant.—*Plant* all kinds of trees in mild weather.—*Plums*, prune; plant.—*Pruning* may be continued generally. (See November.)—*Raspberries*, prune; plant.—*Trench* and manure ground for planting.—*Stake* firmly trees newly planted.—*Standards*, prune generally.—*Suckers*, clear away; plant for stocks.—*Vines*, prune; but last month is to be preferred for this operation, if the foliage had completely decayed.

FLOWER GARDEN.

Anemones, defend in bad weather; plant if mild.—*Auriculas*, defend in inclement weather.—*Bulbs* omitted may be planted if the weather be mild. (See November.)—*Carnations*, defend in inclement weather.—*Composts*, prepare.—*Dig* over borders and dress all quarters generally.—*Edgings*, plant.—*Fibrous-rooted* Perennials and Biennials divide and plant.—*Flowers* (choice), defend generally from inclement weather.—*Grass*, roll occasionally, if

winter be mild.—*Gravel*, roll and keep orderly.—*Hedges*, plant and plash.—*Hyacinths*, defend in inclement weather.—*Leaves*, collect for composts.—*Mulch* round the roots and stems of shrubs newly planted.—*Plant* shrubs of all kinds.—*Potted Plants*, protect in deep frames, &c.; place in hot-house for forcing.—*Prune* all shrubs requiring regulation.—*Ranunculuses*, defend in bad weather; plant if mild.—*Seedlings* of all kinds require protection.—*Stake* shrubs newly planted, and any others requiring support.—*Suckers* may be planted as removed during the winter dressing.—*Tulips*, defend in bad weather.—*Turfs* may be laid in open weather.—*Water* in glasses, change weekly; add a few grains of salt or five drops of spirits of hartshorn.

HOT-HOUSE.

Air, admit freely as the season will admit.—*Bark-beds*, keep in operation.—*Bulbs*, in pots, introduce.—*Cucumbers*, sow in pots, and plunge in bark-bed.—*Flowering Plants*, as Pinks, &c., introduce in pots.—*Glasses* must now all be put in, for forcing commences in earnest; cover during severe frost.—*Kidney Beans* (Dwarf), sown in boxes, &c., introduce.—*Peaches*, "day temp. 55°; keep air moist.—*Pines*, water occasionally; attend strictly to the bottom heat.—*Roses* in pots, introduce.—*Strawberries* in pots, introduce.—*Temperature*, may decline 15° or 20° at night; day temp. for flowering plants 60°.—*Vines* in pots may be introduced; or planted in Hot-house; stems outside bind round thickly with hay-bands, &c.—*Water* is required in small quantities; keep it in the house.

GREEN-HOUSE.

Air, admit as freely as possible; cause the best draught you can.—*Compost*, prepare.—*Earth* of pots, stir when crusted.—*Foggy* air exclude, for damp renders cold injurious.—*Glass*, cover with mats, &c., during severe frost.—*Leaves*, clean; remove decayed.—*Peat Soil*, collect.—*Temperature*, sustain as required by lighting fires; day maximum, 45°; night minimum, 35°.—*Water* sparingly.

DECEMBER MOTH. See *Pæcil-ocampa*.

DECIDUOUS CYPRESS. *Taxodium distichum*.

DECIDUOUS PLANTS are those which shed all their leaves at one time annually. In this country the fall of the leaf is during the autumn. In the East Indies it is during the hottest and driest months.

DECODONS *verticillatus*. Hardy herbaceous. Division. Common soil.

DECUMARIA. Three species. Hardy deciduous twiners. Layers and cuttings. Common soil.

DEFORMITY. The leaves of plants frequently assume an unnatural form on account of their being wounded by insects. Keith, in his *Physiology of Plants*, thus enumerates some of the most customary:—

"The leaves of the apricot, peach and nectarine are extremely liable to be thus affected in the months of June and July. The leaf that has been punctured soon begins to assume a rough and wrinkled figure, and a reddish and scrofulous appearance, particularly on the upper surface; the margins roll inwards on the under side, and inclose the eggs, which are scattered irregularly on the surface, giving it a blackish and granular appearance, but without materially injuring its health.

"In the vine the substance deposited on the leaf is whitish, giving the under surface a sort of frosted appearance, but not occasioning the red and scrofulous aspect of the upper surface of the leaf of the nectarine.

"In the poplar the eggs, when first deposited, resemble a number of small and hoary vesicles, containing a sort of clear and colourless fluid. The leaf then becomes reflected and conduplicate, inclosing the eggs, with a few reddish protuberances on the upper surface. The embryo is nourished by this fluid, and the hoariness is converted into a fine cottony down, which for some time envelops the young fly.

"The leaf of the lime-tree, in particular, is liable to attacks from insects when fully expanded; and hence the gnawed appearance it so often exhibits. The injury seems to be occasioned by some species of puceron depositing its eggs in the parenchyma, generally about the angles that branch off from the midrib. A sort of down is produced, at first green and afterwards hoary, sometimes in patches, and sometimes pervading the whole leaf, as in the case of the vine. Under this cover-

ing the egg is hatched; and then the young insect gnaws and injures the leaf, leaving a hole or scar of a burnt or singed appearance.

"Sometimes the upper surface of the leaf is covered with clusters of wart-like substances. They seem to be occasioned by means of a puncture made on the under surface, in which a number of openings are discoverable, penetrating into the warts, which are hollow and villous within."

For these the only remedy is to remove the insects with the least possible delay; and, if the injury is extensive, adding water and liquid manure to the roots rather more freely, to promote a fresh and larger development of the leaves.

Deformities of the stems of trees and shrubs arise from another cause—from the extension of the woody fibre being greater and longer continued on one side, it frequently becomes contorted. Gardeners usually endeavour to remedy this by making an incision on the inner side of the curvature, and then employing force to restore it to a rectilinear form, causing a gaping wound, and mostly failing to attain the object. If the incision be made on the outer side of the curve, thus dividing the woody fibres that continue to elongate most rapidly, the branch or stem, with but slight assistance, will recover its due form, and there will be no open wound.

"From the fact that there is invariably more woody matter deposited on the side of a stem or branch which is most exposed to the air and light, gardeners have explained to them why those sides of their trained trees which are nearest the wall ripen, as they term it, most slowly, and are benefitted by being loosened from the wall so soon as they are relieved from their fruit.

"If they require any demonstration that this explanation is correct, they need only examine the trees in clumps and avenues: their external sides will be found to enlarge much more rapidly than their internal or most shaded sides."—*Principles of Gard.*

DEGENERATE. A plant is said to have degenerated, or to be not of true stock, when it arises from seed without the good characteristics of the parent. Ill cultivation may render a plant of altered stature, and its produce of deficient flavour; but this is not degene-

racy. A species never degenerates; its seed may be hybridized; but the seedlings are not degenerate—they are varieties. But varieties do degenerate: Brussels sprouts grown at Malines give birth to seeds that yield seedlings quite degenerated; but those seedlings, returned to the neighbourhood of Brussels, yield, after two or three generations, plants that are true Brussels sprouts.

Many varieties of wheat, excellent when cultivated in one locality, yield seed that produces a different and inferior sample in another locality, differing in soil and annual meteorological phenomena.

DELIMA. Two species. Stove evergreen climbers. Cuttings. Loam, peat, and sand.

DELPHINIUM. Larkspur. Fifty-three species, and many varieties.—Hardy perennials and annuals. Division or seed. Common soil.

DENDROBIUM. Fifty-seven species. Stove epiphytes. Division. Turfy peat.

DENDROMECON *rigidum*. Half-hardy evergreen shrub. Seed. Common soil.

DENTARIA. Thirteen species. Hardy tubers. Division or seed. Sandy moist shaded soil.

DESIGN. "Consult the genius of the place" before you determine upon your design, is sound advice; for in gardening, as in all the fine arts, nothing is pleasing that is inappropriate. Mr. Whateley, our best authority on such subjects, truly says,—

"A plain simple field, unadorned but with the common rural appendages, is an agreeable opening; but if it is extremely small, neither a haystack, nor a cottage, nor a stile, nor a path, nor much less all of them together, will give it an air of reality. A harbour, on an artificial lake, is but a conceit; it raises no idea of refuge or security, for the lake does not suggest an idea of danger: it is detached from the large body of water, and yet is in itself but a poor inconsiderable basin, vainly affecting to mimic the majesty of the sea.

"When imitative characters in gardening are egregiously defective in any material circumstance, the truth of the others exposes and aggravates the failure. But the art of gardening aspires to more than imitation; it can create original characters, and give expressions to the several scenes superior to

any they can receive from illusions. Certain properties, and certain dispositions of the objects of nature, are adapted to excite particular ideas and sensations. Many of them have been occasionally mentioned, and all are very well known: they require no discernment, examination, or discussion, but are obvious at a glance, and instantaneously distinguished by our feelings. Beauty alone is not so engaging as this species of character; the impressions it makes are more transient and less interesting; for it aims only at delighting the eye, but the other affects our sensibility. An assemblage of the most elegant forms, in the happiest situations, is to a degree indiscriminate, if they have not been selected and arranged with a design to produce certain expressions; an air of magnificence or of simplicity, of cheerfulness, tranquillity, or some other general character, ought to pervade the whole; and objects pleasing in themselves, if they contradict that character, should therefore be excluded. Those which are only indifferent must sometimes make room for such as are more significant—may occasionally be recommended by it. Barrenness itself may be an acceptable circumstance in a spot dedicated to solitude and melancholy.

“The power of such characters is not confined to the ideas which the objects immediately suggest; for these are connected with others which insensibly lead to subjects far distant perhaps from the original thought, and related to it only by a similitude in the sensations they excite. In a prospect enriched and enlivened with inhabitants and cultivation, the attention is caught at first by the circumstances which are gayest in their season—the bloom of an orchard, the festivity of a hay-field, and the carols of harvest-home; but the cheerfulness which these infuse into the mind expands afterwards to other objects than those immediately presented to the eye; and we are thereby disposed to receive, and delighted to pursue, a variety of pleasing ideas, and every benevolent feeling. At the sight of a ruin, reflections on the change, the decay, and the desolation before us naturally occur; and they introduce a long succession of others, all tinged with that melancholy which these have inspired. Or, if the

monument revives the memory of former times, we do not stop at the simple fact which it records, but recollect many more coeval circumstances, which we see, not perhaps as they were, but as they have come down to us—venerable with age, and magnified by fame. Even without the assistance of buildings, or other adventitious circumstances, nature alone furnishes materials for scenes which may be adapted to almost every kind of expression; their operation is general, and their consequences infinite. The mind is elevated, depressed, or composed, as gaiety, gloom, or tranquillity prevail in the scene; and we soon lose sight of the means by which the character is formed. We forget the particular objects it presents; and giving way to their effects without recurring to the cause, we follow the track they have begun to any extent which the disposition they accord with will allow.”—*Whateley*.

DESMANTHUS. Five species.—Stove aquatics and evergreens. The former by seeds in water; the latter by cuttings in peat and loam.

DESMOCHÆTA. Eight species.—Stove and green-house evergreens, and herbaceous. Seeds, division or cuttings. Sandy loam and peat.

DESMODIUM. Thirty-two species. Chiefly stove evergreens, but a few hardy and herbaceous. Cuttings.—Sandy loam and peat.

DESMONCHUS. Four species. Stove palms. Seed. Sandy peat.

DEUTZIA scabra. Hardy deciduous shrub. Layers and cuttings. Common soil. *D. corymbosa* is a hardy evergreen shrub, similarly propagated.

DEVONSHIRING. See *Paring* and *Burning*.

DEWBERRY. *Rubus cæsius*.

DIANELLA. Nine species. Green-house tubers. Division and seed.—Loam and peat.

DIANTHUS. One hundred species, and very many varieties. Chiefly hardy herbaceous. Seed and pipings. Rich light loam. See *Carnation* and *Pink*.

DIAPENSIA lapponica. Hardy herbaceous. Division and seed. Peat.

DIBBER, or DIBBLE. This instrument for making holes in which to insert seeds or plants, is usually very simple in its construction, being at the

best the head of an old spade-handle. To secure uniformity of depth in planting beans, &c., by this instrument, it is useful to have it perforated with holes to receive an iron peg, at two and three inches from the point, as in the following outline. Fig. 34. It should be

Fig. 34.



shod with iron; for if this be kept bright it will make holes into which the soil will not crumble from the sides. The crumbling is induced by the soil's adhesion to the dibble. For planting potatoes, a dibble with a head three inches diameter at the point, six inches long up to the foot-rest, and with a handle four feet long, is to be preferred. For the insertion of seed a dibble that delivers the seed has been invented by a Mr. Smith.

DICERMA. Three species. Stove evergreen shrubs. Cuttings. Loam and peat.

DICHILUS *lebeckioides*. Green-house evergreen shrub. Cuttings.—Sandy loam and peat.

DICHORIZANDRA. Five species. Stove herbaceous. Division or seed. Common soil.

DICHOSMA *bifida*. Green-house evergreen shrub. Cuttings. Peat and sand.

DICKSONIA. Seven species. Stove ferns. Division and seed. Loam and peat.

DICLIPTERA. Eleven species.—Chiefly stove evergreen shrubs, but two are annuals. The latter are raised from seed; the others from cuttings. Light soil, with a little peat.

DICRYPTA. Four species. Stove epiphytes. Offsets. Peat and potsherds.

DICTAMNUS. Three species. Hardy herbaceous. Seed. Common soil.

DIDYMOCHEILA *pulcherrima*.—

Stove fern. Seed and division. Sandy loam and leaf-mould.

DIELYTRA. Nine species. Hardy herbaceous. Division or seed. Rich light loam.

DIERVILLA *lutea*. Hardy deciduous shrub. Suckers. Common soil.

DIETES. Three species. Half-hardy herbaceous. Suckers or seed. Light loam.

DIGGING is an operation performed with the spade or fork, having for its object a loosening of the soil so as to render it more fit for the reception of seeds or plants. For its correct performance Mawe and Abercrombie give these directions:—

“Begin at one end of the piece of ground, and with your spade open a trench quite across, one good spade wide and one deep, carrying the earth to the end or place where you finish; then, keeping your face to the opening, proceed to dig, one spade deep, regularly from one side of the piece to the other, turning the spits neatly into the trench, and the next course against these; and so keep digging straight back, spit and spit, still preserving an open trench, a good spade width and depth, between the dug and undug ground, that you may have full room to give every spit a clean turn, taking all the spits perpendicularly, and not taking too much before the spade, especially in stiff land, or where the surface is full of weeds, or is much dunged; so giving every spit a clean turn, the top to the bottom and the bottom to the top, that the weeds or dung on the surface may be buried a due depth, and that the clean fresh earth may be turned up.

“As you proceed break all large clods, and preserve an even surface, carrying both sides and middle on equally, unless one side shall be hollow; then carry on the hollow side first in a kind of gradual sweep, inclining the spits of earth rather that way, which will gradually raise that side and reduce the high one, observing the same if both sides are high and the middle hollow, or both sides hollow and the middle high, always keeping the lower ground advancing gradually before the higher; by which you will always maintain a uniform level, whether horizontal or declining.

“The same should also be observed in beginning to dig any piece of ground,

that if one corner is much lower than another, carry on the lower part somewhat first, in a kind of easy sweep or slanting direction, as far as necessary. Likewise, in finishing any pieces of digging, gradually round upon the lower side so as to finish at the highest corner; and having digged to the end, or that part of any piece of ground where you intend to finish, then use the earth digged out of the first trench to make good the last opening equal with the other ground. In plain digging dunged ground, if the dung is quite rotten, you may dig clean through, giving each spit a clean turn to bury the dung in the bottom of the trench; but if you cannot readily do this, trim the dung a spade's width at a time into the furrow or open trench, and so dig the ground upon it, which is rather the most effectual method, whether rotten or long fresh dung.

"In the course of digging all weeds that are perennial should be carefully picked out, particularly couch-grass and bear-bind; for the least bit of either will grow. But annual weeds, groundsel, and the like, should be turned down to the bottom of the trench, where they will rot.

"A man will dig by plain digging of light free-working clean ground, eight, ten, or twelve rods a day, from six to six, though in some of the light clean ground about London, I have known a man turn up fifteen or twenty rods a day, from five to seven; on the other hand, in stiff stubborn soils, a man may work hard for six or eight rods in a day of twelve hours; and that digging by trenches, or trenching, if only one spade deep without the crumbs or shovelling at bottom, a man will dig almost as much as by plain digging; or two spades' depth, from four to six rods a day may be good work, though in harsh working ground digging three or four rods per day may be hard work." Most garden soils dig best the day after a fall of rain; and if the soil has in its composition a larger proportion than usual of clay, the operation will be facilitated by dipping occasionally the spade into water. Most gardeners object to digging while snow is upon the ground, and, as Dr. Lindley justly observes, the objection is not mere prejudice, for experience proves the bad result of the practice. The evil is owing to the great quantity of heat

required to reduce ice or snow from the solid to the fluid state. A pound of snow newly fallen requires an equal weight of water, heated to 172° , to melt it, and then the dissolved mixture is only of the temperature of 32° . Ice requires the water to be a few degrees warmer, to produce the same result. When ice or snow is allowed to remain on the surface, the quantity of heat necessary to reduce it to a fluid state is obtained chiefly from the atmosphere; but when buried so that the atmospheric heat cannot act directly upon it, the thawing must be very slowly effected, by the abstraction of heat from the soil by which the frozen mass is surrounded. Instances have occurred of frozen soil not being completely thawed at midsummer; when so, the air, which fills the interstices of the soil, will be continually undergoing condensation as it comes in contact with the cold portions; and, accordingly, the latter will be in a very saturated condition even after they have become thawed.—*Gard. Chron.*

Very few people ever consider in detail the expenditure of labour required from the gardener when digging. It is a labour above all others calling into exercise the muscles of the human frame, and how great is the amount of this exercise may be estimated from the following facts:—

In digging a square perch of ground in spits of the usual dimensions (seven inches by eight inches) the spade has to be thrust in 700 times; and as each spadeful of earth, if the spade penetrates nine inches, as it ought to do, will weigh on the average full seventeen pounds, 11,900 pounds of earth have to be lifted, and the customary pay for doing this is two-pence half-penny. As there are 100 perches or rods in an acre, in digging the latter measure of ground the garden labourer has to cut out 112,000 spadefuls of earth, weighing in the aggregate 17,000 cwt., or 850 tons, and during the work he moves over a distance of fourteen miles. As the spade weighs between eight and nine pounds, he has to lift, in fact, during the work, half as much more weight than that above specified, or 1,278 tons. An able-bodied labourer can dig ten square perches a day. A four-pronged fork, with the prongs twelve inches long, and the whole together forming a head eight inches wide, is a more efficient tool for

digging than the common spade. It requires the exertion of less power; breaks up the soil more effectually; and does not clog even when the soil is moist wet. It is less costly than the spade, and when worn can be relaid at a less expense.

DIGITALIS. Twenty-six species. Hardy herbaceous. Seed. Common soil.

DILATRIS. Three species. Green-house herbaceous. Division or seed. Sandy peat.

DILL. (*Anethum graveolens*.)

Use.—Its leaves and umbels are used in pickling, and the former in soups and sauces.

Soil and Situation.—It may be cultivated in any open compartment; but if for seed, a sheltered situation, and a soil rather dry than damp, is to be allotted for it.

Time of Sowing.—It is best sown immediately that it is ripe, for if kept out of the ground until the spring it often is incapable of germinating. If neglected until the spring, it may be sown from the close of February until the commencement of May, in drills a foot apart. The plants are to remain where sown, as they will not bear removing. When of three or four weeks' growth they must be thinned to about ten inches apart; for if not allowed room they spindle, their leaves decay, no lateral branches are thrown out, and their seed is not so good; in every stage of growth they require to be kept clear of weeds. The leaves are fit for gathering as wanted, and the umbels about July and August. In September their seed ripens, when it must be immediately cut, and spread on a cloth to dry, as it is very apt to scatter.

DILLENIA speciosa. Stove evergreen tree. Cuttings. Sandy loam.

DILLWYNIA. Fifteen species. Green-house evergreen shrubs. Cuttings. Sandy loam and peat.

DINEMA polybulbon. Stove epiphyte. Offsets. Peat and postherds.

DINETUS paniculata and *racemosa*. The first a stove perennial; the second a hardy annual twiner. The first by cuttings; the second by seed. Rich sandy soil.

DIODIA. Four species. Stove evergreen trailers, except *D. virginica*, which is hardy and deciduous. Cuttings. Light soil.

DIOMEDEA. Three species. Green-house evergreen shrubs. Cuttings. Rich light loam.

DIOSCOREA. Yam. Five species. Stove tubers. Division. Light rich soil.

DIOSMA. Twenty-three species. Green-house evergreen shrubs. Cuttings. Peat and sand.

DIOSPYROS. Twenty-three species. Chiefly stove evergreen trees, but a few are hardy. Cuttings. Light loam.

DIPHYLLEIA cymosa. Hardy herbaceous. Division. Light rich soil.

DIPHACA cochinchinensis. Green-house evergreen shrub. Cuttings. Peat and loam.

DIPHYSA carthaginensis. Stove evergreen shrub. Cuttings. Sandy loam and peat.

DIPLACUS. Two species. Green-house evergreen shrubs. Cuttings. Rich sandy loam.

DIPLAZIUM. Nine species. Stove ferns. Division or seed. Loam and peat.

DIPLOCOMA villosa. Hardy herbaceous. Seed and division. Common soil.

DIPLOLÆNA dampieri. Green-house evergreen shrub. Cuttings. Loam and peat.

DIPLOPAPPUS incanus. Half-hardy evergreen shrub. Cuttings. Sandy loam.

DIPLOPELTIS hugelii. Green-house herbaceous. Young cuttings. Common soil.

DIPLOPHYLLUM veronicae forme. Hardy annual trailer. Seed. Common soil.

DIPLOTHIEMIUM. Two species. Stove palms. Seed. Rich light loam.

DIPODIUM punctatum. Stove orchid. Division. Sandy loam and peat.

DIPSACUS. Six species. Hardy biennials. Seed. Common soil.

DIPTERIX odorata. Stove evergreen tree. Cuttings. Rich loam.

DIRCA palustris. Hardy deciduous shrub. Layers or seeds. Sandy loam.

DISA. Twelve species. Green-house orchids. Division. Peat, loam, and sand.

DISANDRA prostrata. Green-house evergreen trailer. Division or cuttings. Rich light soil.

DISBUDDING is the removal, soon after they have burst into leaves, of such buds as, if allowed to grow into shoots, would be misplaced. Thus,

buds protruded directly in the front of branches trained against walls, or fore-right shoots, as they are correctly termed, and buds that would produce shoots in places already sufficiently filled with branches, may be removed, or disbudded. The object is to strengthen the desirably-placed buds by thus confining the expenditure of sap upon them. There is no better mode of aiding a weakly plant to a more vigorous and robust growth than judicious disbudding; but an over-robust and super-luxuriant tree had better be allowed to exhaust itself by a profuse development of leaf buds.

DISCHIDIA. Two species. Stove evergreen trailers. Cuttings. Sandy loam.

DISEASES. Dr. Good, the distinguished medical writer, has remarked, that the morbid affections to which the vegetable part of the creation is liable, are almost as numerous as those which render decrepid and destroy the animal tribes. It would be difficult, perhaps, whatever system of nosology is followed, to place a finger upon a class of animal physical diseases of which a parallel example could not be pointed out among plants. The smut which ravages our corn crops; the mildew which destroys our peas; the curl that is annually infecting more destructively our potatoes; the ambury, or club-root, to which our turnips and other species of brassica are liable; the shanking, or ulceration, which attacks the stalks of our grapes, are only a few of the most commonly observed diseases to which the plants we cultivate are liable.

Disease is the negation of health; and as the health of a plant is the correct performance of its functions, disease may be defined to be an incorrect performance of the functions. Such incorrectness arises from four causes—vital energy declining from old age—parasites—improper food, either in quality or quantity—and inauspicious temperature. If these could be all avoided, a plant might enjoy a vigorous immortality. Such, however, is not the lot of any organized being, and in proportion to the debilitating circumstances are the nature, the intensity, and final consequences of the disease induced. The little known relative to the diseases which infest the gardeners' crops, will be found under their respective titles.

DISEMMA. Two species. Stove evergreen climbers. Cuttings. Loam and peat.

DISPERIS. Three species. Green-house orchids. Division. Peat, loam, and sand.

DISPORUM. Two species. Half-hardy herbaceous. Division and seed. Peat and loam.

DISSOLENA *verticillata*. Green-house evergreen shrub. Cuttings. Rich light soil.

DITTANY. *Origanum dictamnus*.

DIURIS. Eight species. Green-house orchids. Division. Peat, loam, and sand.

DODECATHEON. Two species, and several varieties. Hardy herbaceous. Division. Light loam. See *American Cowslip*.

DOG-WOOD. *Cornus*.

DOLICHOS. Sixteen species. The two green-house twiners, *D. jacquini* and *lignosus*, are the only two worth cultivating. Cuttings. Rich sandy loam.

DOLIOCARPUS calinea. Stove evergreen climber. Cuttings. Turfy loam and peat.

DOMBEYA. Six species. Stove evergreen trees. Cuttings. Sandy loam and peat.

DONDIA epipactris. Hardy herbaceous. Seed or division. Loam and peat.

DOODIA. Four species. Green-house ferns. Division and seed. Loam and peat.

DORONICUM. Nine species. Hardy herbaceous. Division. Common soil.

DORTMANNA. Two species. Hardy herbaceous. Division. Peat.

DORYCNIUM. Eight species. Hardy annual, herbaceous and evergreen. Seed. Sandy loam.

DOUBLE FLOWERS. Hybridizing, aided by cultivation, gives birth to these objects of the gardener's care generally designated double flowers, which are such beauteous ornaments of our borders and parterres. To the uninitiated it seems incredible that the double moss rose should be a legitimate descendant from the briar; neither do the flowers of the Fair Maid of France appear less impossible derivatives from those of the *Ranunculus platanifolius*; nor bachelors' buttons from the common buttercup; yet so they are. Double flowers, as they are popularly called, are more correctly discriminated as the full flow-

er, the multiplicate flower, and the proliferous flower.

The full flower is a flower with its petals augmented in number by the total transformation into them of its stamens and its pistils. One-petalled flowers rarely undergo this metamorphosis, but it is very common in those having many petals, as in the carnation, ranunculus, rose, and poppy. But this is not the only mode in which a flower becomes full, for in the columbine (*Aquilegia*) it is effected in three different ways, viz., by the multiplication of petals to the exclusion of the nectaries; by the multiplication of the nectaries to the exclusion of the petals; and by the multiplication of the nectaries, whilst the usual petals remain.

Radiated flowers, such as the sunflower, dahlia, anthesis, and others, become full by the multiplication of the florets of their rays to the exclusion of the florets of their disk. On the contrary, various species of the daisy, *matricaria*, &c., become full by the multiplication of the florets of the disk.

The multiplicate flower has its petals increased by the conversion of a portion of its stamens, or of its calyx, in those forms. It occurs most frequently in polypetalous flowers. Linnæus gives the only instances I know of the conversion of the calyx into petals, and these are to be observed in the pink (*Dianthus caryophyllus*), and a few of the Alpine grasses.

A proliferous flower has another flower or a shoot produced from it, as in the variety of the daisy popularly known as the hen-and-chickens. It occurs also more rarely in the ranunculus, pink, marigold, and hawkweed. A leafy shoot often appears in the bosom of the double-blossomed cherry, anemone, and rose.

A due supply of moisture, but rather less than the plant most delights in, when the production of seed is the desired object, a superabundant supply of decomposing organic matter to its roots, and an exposure to the greatest possible degree of sun-light, are the means successfully employed to promote that excessive development of the petals which characterize double flowers.

By these means a greater quantity of sap is supplied to the flower than the natural extent of the petal can elaborate; and following the laws of nature

specified elsewhere, those parts required for the extra elaboration, are developed at the expense of those not demanded for the purpose.

The chief office of the petals is this preparation of nourishment for the stamens, and for the most part they fade together, usually enduring until impregnation has been effected, or has altogether failed. In double flowers, too, as was observed by the late Sir J. E. Smith, the corolla is much more durable than in single ones of the same species, as anemones and poppies, because as he conceived, in such double flowers the natural function not being performed, the vital principle of their corolla is not so soon exhausted. Advantage may be taken of this to prolong the duration of flowers by cutting away the pistils or stamens, whichever are least conspicuous, with a sharp pair of pointed scissors.

Although an abundant supply of nourishment is absolutely necessary for the production of double flowers, it is quite as certain that such supply will not of a certainty cause their appearance; there must be some tendency in the parent thus to sport, otherwise the superfluity of food will not have the desired influence. That abundance of nourishment is necessary, appears from the fact that if the double daisy or the double narcissus be grown in a poor soil, they speedily produce none but single flowers; yet if they again be restored to a rich soil, they may with care be made to produce an unnatural profusion of petals. Mr. D. Beaton's estimate of a double flower is original. He says that cultivation having enlarged all the parts of a plant, the constitutional vigour thus obtained is transferred to the next generation, and to some of the seedlings, in a measure even greater than that possessed by the parent. Extraordinary supplies of nourishment under favourable circumstances, invigorate still further the improved race, and so on through many generations. During this time cultivation produces the very opposite of double flowers, and Mr. Beaton thinks it would continue to do so, if it were possible to keep up every member of each generation to the same degree of health and vigour; but accidents and diseases overtake some of the plants, and double flowers are the produce from the decrepits. Cultivation, according to this idea,

is only indirectly the cause of double flowers, and these a retrograde step from a high state of development.

Whether my own opinion or Mr. Beaton's be correct, it is quite certain that in practice the plants from which double-flowered varieties are sought, must be kept in the highest state of development by supplying them abundantly with all the assistance to vigorous growth; and when the seed vessels are formed, they should be reduced in number in order to make the seed in those remaining as large and perfect as possible. In the course of a few generations, seedlings appear, having flowers with an excess of petals, and seeds being obtained from these, or from other flowers impregnated by their stamens, and the same high cultivation continued, the excess of petals increases and becomes a permanent habit.

DOUCIN STOCK. See *Stock*.

DOUGLASIA nivalis. Hardy herbaceous. Seed. Peat and sand.

DRABA. Forty-one species. Hardy herbaceous chiefly, and a few annuals. Seed. Loam and peat.

DRACENA. Twenty-two species. Stove evergreen trees and shrubs. Cuttings. Sandy loam.

DRACOCEPHALUM. Twenty species. Chiefly hardy herbaceous. Division or seed. Common soil.

DRACOPHYLLUM. Three species. Green-house evergreen shrubs. Cuttings. Sandy peat.

DRAGON'S-HEAD. *Dracocephalum*.

DRAGON TREE. *Dracena draco*.

DRAINING. There is scarcely a garden existing that would not be benefited by under-draining. Every gardener knows the absolute necessity for a good drainage under his wall-trees and vines, but few gardeners ever think for a moment, whether there is any escape and out-fall for the water he has drained from immediate contact with the roots of the above-named favoured trees. Every garden should have drains cut, varying in depth from two to three feet, according to the depth of the soil, with an interval of twenty-four feet between the drains; twelve feet will not be too near in clayey soils. At the bottom of the drains should be placed one-inch pipes; these should be well puddled over, six inches deep with clay, and then the earth returned. They should have an outfall into a ditch, at the least elevated

side of the garden. By having the pipes with a bore no larger than an inch, moles cannot creep in, and that bore is large enough to carry off all the water, after even the heaviest rains. Draining farm-lands has been performed to a great extent in England, and with most advantageous results: at Lord Hatherton's residence, Teddesley Hay, in Staffordshire, four hundred and sixty-seven acres, formerly letting for an average rental of 12s. per acre, were all drained for an outlay of 3l. 4s. 7d. per acre, and their rental now averages more than 31s. per acre.

To plants in pots, good drainage is not less essential than to those in our borders.

DREPANOCARPUS lunatus. Stove evergreen shrub. Cuttings. Rich loam.

DRILLING. No crop in the garden should be sown broadcast, for drilling saves seed and labour; and although in some cases it takes more time to insert the seed in drills, yet this is more than compensated by the time saved during the after-culture, for the thinning and hoeing are greatly facilitated.

The distance apart appropriate for the drills for particular crops, will be found under their respective titles; they are usually made with a hoe and line; but for mustard, cress, and other small seeds, the *drill-rake* is often used. The teeth are set six inches apart, and are broad and coulter formed. When the drills are required to be less than six inches apart, the implement can be worked diagonally.

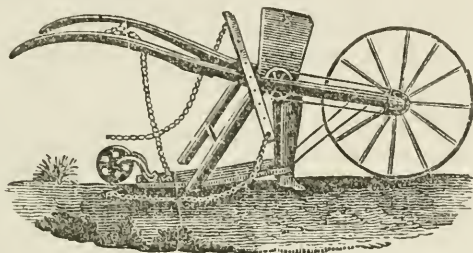
DRILL BARRÔWS, or SEED SOWERS. "Various have been the contrivances for sowing seeds, many having the mere merit of ingenuity, without practical utility; because when used with adhesive seeds, or those of rough form, they clog, and, in consequence, sow irregularly. Those now offered, obviate all such objections, being suited alike for Turnips, Beets, Onions, Carrots, Parsnips, &c. By the use of a good Drill, the farmer or gardener can save one-half of his seed, (that is, none are needlessly sown,) and do the work at much less expense, as well as with greater rapidity than by the ordinary mode of sowing; as the Drill opens the furrow, drops the seed, covers and rolls it down."—*Rural Register*.

A very simple and low-priced *Drill* is formed by a tin tube, or hollow cane, surmounted by a funnel-like mouth-

piece, to receive the seeds. The operator holds it in his left hand, directing the lower extremity to the line where he desires the seed to fall, and with the fingers of his right hand dropping the

seeds into the funnel at the required rapidity—a little practice enables the sower to pass over the ground with speed, and perform the work with regularity.

Fig. 35.



DRIMIA. Thirteen species. Green-house bulbs. Offsets. Sandy loam and peat.

DROSERA. Nine species. Hardy and green-house aquatics. Seeds. Peat and water.

DRUMMONDIA miteloides. Hardy herbaceous. Division. Peat.

DRYANDRA. Nineteen species. Green-house evergreen shrubs. Cuttings. Turfy sandy loam and peat.

DRYAS. Four species. Hardy evergreen trees. Seed and cuttings. Peat and loam.

DRYMONIA. Two species. Stove evergreen climbers. Cuttings. Rich sandy loam.

DRYPETES crocea. Stove evergreen shrub. Cuttings. Loam and peat.

DRYPIS spinosa. Hardy evergreen shrub. Cuttings and seed. Sandy peat and loam.

DRY-STOVE is a hot-house devoted to the culture of such plants as require a high degree of heat, but a drier atmosphere than the tenants of the bark-stove. Consequently, fermenting materials and open tanks of hot-water are inadmissible; but the sources of heat are either steam or hot-water pipes, or flues. See *Stove*.

DUMASIA. Two species. Green-house evergreen twiners. Cuttings. Peat and sandy loam.

DUMB-CANE *Caladium sequinum.*

DUMERILIA paniculata. Stove evergreen shrub. Cuttings. Common soil.

DUNG. Under this title our attention must be confined to the fæces and urines of animals, and that one most common compound, *stable dung*.

Night-soil is the richest of the manures to be arranged under this head. It is composed of human fæces and urine, of which the constituents are as follows:—

FÆCES.

Water	73.3
Vegetable and animal remains	7
Bile	0.9
Albumen	0.9
Peculiar and extractive matter	1.2
Salts (carbonate of soda, common salt, sulphate of soda, ammonia-phosphate of magnesia, and phosphate of lime)	2.7
Insoluble residue	14.0

URINE.

Urate of ammonia	0.298
Sal-ammoniac	0.459
Sulphate of potash	2.112
Chloride of potassium . . .	3.674
— sodium (common salt)	15.060
Phosphate of soda	4.267
— lime	0.209
Acetate of soda	2.770
Urea and colouring matter	23.640
Water and lactic acid . . .	47.511

After stating the above analyses in his excellent work, "*On Fertilizers*," Mr. Cuthbert Johnson proceeds to observe that, "The very chemical compo-

sition, therefore, of this compost would indicate the powerful fertilizing effects which it is proved to produce. The mass of easily soluble and decomposable animal matters and salts of ammonia with which it abounds, its phosphate of lime, its carbonate of soda, are all, by themselves, excellent fertilizers, and must afford a copious supply of food to plants.

"The disagreeable smell may be destroyed by mixing it with quicklime; and if exposed to the atmosphere in thin layers in fine weather, and mixed with quicklime, it speedily dries, is easily pulverized, and in this state may be used in the same manner as rape cake, and delivered into the furrow with the seed."

From the experiments of M. Schubler and others, the relative value of night-soil is as follows:—

"If a given quantity of the land sown without manure yields three times the seed employed, then the same quantity of land will produce five times the quantity sown when manured with old herbage, putrid grass or leaves, garden stuff, &c.; seven times with cow-dung; nine times with pigeon's dung; ten times with horse-dung; twelve times with human urine; twelve times with goat's dung; twelve times with sheep's dung; and fourteen times with human manure, or bullock's blood. But if the land be of such quality as to produce without manure five times the sown quantity, then the horse-dung manure will yield fourteen, and human manure nineteen and two-thirds the sown quantity."—*Johnson's Fertilizers*.

Fowl Dung, if composed partly of that of the duck, which is a gross feeder, is nearly equal to guano. This, and that of the pigeon contain much ammonia, and all abound in phosphate of lime, mixed with decomposing organic matters and uric acid, all highly valuable as fertilizers.

Stable or Farm-yard Dung is usually composed of the following matters:—

HORSE URINE.

Water and mucus	9.4
Carbonate of lime	1.1
soda	0.9
Hippurate of soda	2.4
Chloride of potassium	0.9
Urea	0.7

But besides the above, it contains com-

mon salt, phosphate of lime, and sulphate of soda.

COW URINE.

Water	66
Phosphate of lime	3
Chloride of potassium, and } sal-ammoniac }	15
Sulphate of potash	6
Carbonate of potash	4
--ammonia }	4
Urea	4

"One thousand parts of dry wheat straw being burnt, yielded M. Saussure forty-eight parts of ashes; the same quantity of the dry straw of barley yielded forty-two parts of ashes. The portion dissipated by the fire would be principally carbon, (charcoal,) carburated hydrogen, gas, and water; one hundred parts of these ashes are composed of—

Various soluble salts, principally carbonate and sulphate of potash	22½
Phosphate of lime (earthy salt of bones)	6½
Chalk (carbonate of lime)	1
Silica (flint)	61½
Metallic oxide (principally iron)	1
Loss	7½

"The straw of barley contains the same ingredients, only in rather different proportions.

"The solid excrements of a horse fed on hay, oats, and straw, contain, according to the analysis of M. Zierl, in 1000 parts:—

Water	698
Picromel and salts	20
Bilious and extractive matter	17
Green matter, albumen, mucus, &c.	63
Vegetable fibre, and remains of food	202

"These, when burnt, yielded to the same chemist sixty parts by weight of ashes, which were composed of—

Carbonate, sulphate, and muriate of soda	5
Carbonate and phosphate of lime	9
Silica	46"

—*Journ. Roy. Agr. Soc.*, Vol. I. p. 489.

Mr. Cuthbert Johnson, after giving these analyses in his work already quoted, observes further, that, "the fæces of cattle fed principally on turnips have been analysed by M. Einhof; 100 parts evaporated to dryness yielded 28½ parts of solid matter; the 71½ parts lost in drying would consist principally of water and some ammoniacal salts. In half a pound, or 3,840 grains, he found 45 grains of sand; and by diffusing it through water, he obtained about 600 grains of a yellow fibrous matter, resembling that of plants, mixed with a very considerable quantity of slimy matter. By evaporating fæces to dryness, and then burning them, he obtained an ash, which contained, besides the sand, the following substances:—

Lime	12.
Phosphate of lime	12.5
Magnesia	2.
Iron	5.
Alumina, with some manga- nese	14.
Silica	52.
Muriate and sulphate of } potash }	1.2

"The ingredients of which the urine and fæces of cattle are composed, will of course differ slightly in different animals of the same kind, and according to the different food upon which they are fed; but this difference will not in any case be found very material.

"The excrements of the sheep have been examined by Block; according to him, every 100 lbs. of rye-straw given as fodder to sheep yield 40 lbs. of excrements (fluid and solid); from 100 lbs. of hay, 42 lbs.; from 100 lbs. of potatoes, 13 lbs.; from 100 lbs. of green clover, 8½ lbs.; and from 100 lbs. of oats, 49 lbs. of dry excrement. The solid excrements of sheep fed on hay, were examined by Zierl; 1,000 parts by weight being burned, yielded 96 parts of ashes, which were found to consist of—

Carbonate, sulphate, and } muriate of soda }	16
Carbonate and phosphate of } lime }	20
Silica	60

"One hundred parts of the urine of sheep kept at grass, contained—

Water	96.
Urea, albumen, &c.	2.8
Salt of potash, soda, lime, } and magnesia, &c. . . . }	1.2"

—*Journ. Roy. Agr. Soc.*

There have been many arguments and much difference of opinion among cultivators with regard to the advantage of employing dung in a fresh or in a putrid state, and as is too often the case, both parties have run into extremes, the one side contending for the propriety of employing it quite fresh from the farm-yard, the other contending that it cannot well be too rotten.

The mode employed by Lord Leicester, is the medium between these equally erroneous extremes. He found that the employment of the fresh dung certainly made the dung go much farther; but then a multitude of the seeds of various weeds were carried on to the land along with the manure. He has therefore since used his compost when only in a half putrefied state, (called short dung by farmers,) and hence the seeds are destroyed by the effects of the putrefaction, and the dung still extends much farther than if suffered to remain until quite putrefied. Putrefaction cannot go on without the presence of moisture. Where water is entirely absent, there can be no putrefaction; and hence many farmers have adopted the practice of pumping the drainage of their farm-yards over their dung heaps; others invariably place them in a low damp situation. This liquid portion cannot be too highly valued by the cultivator. The soil where a dunghill has lain in a field is always distinguished by a rank luxuriance in the succeeding crop, even if the earth beneath, to the depth of six inches, is removed and spread with the dunghill.

The controversy, too, which once so keenly existed, as to the state of fermentation in which dung should be used on the land, has now pretty well subsided. There is no doubt but that it cannot be applied more advantageously than in as fresh a state as possible, consistent with the attainment of a tolerably clean husbandry, and the destruction of the seeds of weeds, grubs, &c., which are always more or less present in farm-yard dung. These are the only evils to be appre-

hended from the desirable employment of this manure in the freshest state; for otherwise the loss of its most valuable constituents commences as soon as fermentation begins. This was long since demonstrated by Davy, whose experiments I have often seen repeated and varied. He says, "I filled a large retort capable of containing three pints of water with some hot fermenting manure, consisting principally of the litter and dung of cattle. I adapted a small receiver to the retort, and connected the whole with a mercurial pneumatic apparatus, so as to collect the condensable and elastic fluids which might arise from the dung. The receiver soon became lined with dew, and drops began in a few hours to trickle down the sides of it. Elastic fluid likewise was generated; in three days thirty-five cubical inches had been formed, which when analyzed were found to contain twenty-one cubical inches of carbonic acid; the remainder was hydro-carburet, mixed with some azote, probably no more than existed in the common air in the receiver. The fluid matter collected in the receiver at the same time amounted to nearly half an ounce. It had a saline taste and a disagreeable smell, and contained some acetate and carbonate of ammonia. Finding such products given off from fermenting litter, I introduced the beak of another retort filled with similar dung very hot at the time, in the soil amongst the roots of some grass in the border of a garden. In less than a week a very discernible effect was produced on the grass, upon the spot exposed to the influence of the matter disengaged in fermentation; it grew with much more luxuriance than the grass in any other part of the garden."—*Lectures*.

Nothing, indeed, appears at first sight so simple as the manufacture and collection of farm yard dung, and yet there are endless sources of error into which the cultivator is sure to fall, if he is not ever vigilant in their management. The late Mr. Francis Blake, in his valuable tract upon the management of farm-yard manure, dwells upon several of these; he particularly condemns the practice of keeping the dung arising from different descriptions of animals in separate heaps or departments, and applying them to the land without inter-

mixture. "It is customary," he adds, "to keep the fattening neat cattle in yards by themselves, and the manure thus produced is of good quality, because the excrement of such cattle is richer than that of lean ones. Fattening cattle are fed with oil cake, corn, Swedish turnips, or some other food, and the refuse and waste of such food thrown about the yard increases the value; it also attracts the pigs to the yard. These rout the straw and dung about in search of grains of corn, bits of Swedish turnips, and other food; by which means the manure in the yard becomes more intimately mixed, and is proportionally increased in value. The feeding troughs and cribs in the yard should for obvious reasons be shifted frequently.

"The horse-dung," continues Blake, "is usually thrown out at the stable doors, and there accumulates in large heaps. It is sometimes spread a little about, but more generally not at all, unless where necessary for the convenience of ingress and egress, or perhaps to allow the water to drain away from the stable door. Horse-dung lying in heaps very soon ferments and heats to an excess, the centre of the heap is charred or burned to a dry white substance, provincially termed fire-fanged. Dung in this state loses from fifty to seventy-five per cent. of its value. The diligent and attentive farmer will guard against such profligate waste of property by never allowing the dung to accumulate in any considerable quantity at the stable doors. The dung from the feeding hog-sties should also be carted and spread about the store cattle yard in the same manner as the horse-dung.

"The heat produced by the fermentation of the dung of different animals has been made the subject of repeated experiment. When the temperature of the air was 40°, that of common farm-yard dung was 70°; a mixture of lime, dung, and earth, 55°; swine and fowl's dung, 85°." — *Farmer's Magazine, Johnson's Fertilizers*.

"The quality of farm-yard compost naturally varies with the food of the animals by which it is made; that from the cattle of the straw-yard is decidedly the poorest, that from those fed on oil-cake, corn, or Swedes, the richest. Of stable dung, that from corn-fed horses is most powerful, from those subsisting

on straw and hay the poorest; the difference between the fertilizing effects of the richest and the inferior farm-yard dung is much greater than is commonly believed; in many instances the disparity exceeds one-half; thus that produced by cattle fed upon oil-cake is fully equal in value to double the quantity fed upon turnips. Hence the superior richness of the manure of fattening swine to that of pigs in a lean state, and the far superior strength of night-soil to any manure produced from merely vegetable food. Chemical examinations are hardly necessary to prove these facts. Every farmer who has had stall-fed cattle will testify to their truth; every cultivator will readily acknowledge the superiority of 'town-made,' that is, corn-produced stable dung, to that from horses fed only on hay and straw, and that night-soil is far superior in strength to either. The relative quantities employed by the cultivator betray the same fact, for on the soils where he applies twenty loads of good farm-yard compost per acre, he spreads not half that quantity of night-soil. The drainage from all manures should be scrupulously preserved, for the liquid or soluble portion constitutes their richest portion. The escape of their gaseous products during decomposition should also be checked as much as possible, for they contain ammonia, carbonic acid, &c., all abounding in constituents valuable as fertilizers."—*Johnson's Farmer's Encyclop.*

DURANTA. Seven species. Stove evergreen shrubs. Cuttings. Loam and peat.

DUVALIA. Twelve species. Stove evergreen shrubs. Cuttings. Sandy loam and lime rubbish.

DUVAUA. Four species. Green-house evergreen shrubs. Cuttings. Common soil.

DWARF FAN-PALM. *Chamærops humilis.*

DWARF MOLY. *Allium chamæmoly.*

DWARF STANDARD is a fruit tree on a very short stem, with its branches unshortened and untrained.

DYCKIA *rariflora.* Green-house herbaceous. Suckers. Sandy peat and loam.

EARTHS. Every cultivated soil is mainly composed of four earths in vari-

ous proportions:—Silica, or pure flint; Alumina, or pure clay; Lime, combined with carbonic acid in the state of chalk; and Magnesia. See *Soil.*

EARTHING-UP, or drawing the soil in a ridge to the stems of plants, is beneficial to fibrous-rooted plants, by reducing the distance from the surface of the extremities of the plant's roots; by inducing the production of rootlets from the stem; and sheltering the winter standing crops, for the closer the foliage of these are to the earth the less is the reduction of heat from the latter, either by radiation or contact with the colder air.

But to tuberous-rooted plants, as the potato, it is detrimental. In my experiments it reduced the produce one-fourth. Many farmers who cultivate the potato extensively, do so with the horse-hoe alone, no longer using the plough to earth-up, as was formerly the universal practice, and is now with those who never profit by experience.

EARWIG. *Forficula auricularis.* This destroyer of the peach, apricot, plum, dahlia, pink and carnation, commits its ravages only at night, retiring during the day to any convenient shelter in the vicinity of its prey. Advantage must be taken of this habit, and if small garden pots with a little moss within be inverted upon a stick, and pieces of the dry hollow stem of the sunflower, or Jerusalem artichoke, be placed in the neighbourhood of the fruits and flowers enumerated, many of the insects will resort thither, and may be shaken out and destroyed. As earwigs are winged insects, it is useless to guard the stems of plants in any mode.

EBENUS. Two species. Green-house evergreens. Seed. Peat and loam.

ECASTAPHYLLUM. Three species. Stove evergreen shrubs. Cuttings. Rich loam.

ECCREMOCARPUS *longiflora.* Green-house evergreen climber. Cuttings. Sand, loam, and peat.

ECHEVERIA. Seven species. Green-house and stove succulents. Cuttings. Sandy loam and peat.

ECHINACEA. Six species. Hardy herbaceous. Division. Light rich loam.

ECHINOCACTUS. Sixty-one species. Stove evergreen. Offsets. Sandy peat, and a little calcareous rubbish.

ECHINOPS. Sixteen species. Hardy herbaceous. Division. Common soil.

ECHITES. Twenty-one species. Chiefly stove evergreen twiners. Cuttings. Loam and peat.

ECHIUM. Fifty-eight species. Hardy and green-house shrubs and annuals. Layers and cuttings, or seeds. Loam and peat.

EDGING. This for the kitchen-garden and all other places where neatness, not ornament, is the object, may consist of useful herbs, the strawberry &c. As an ornamental edging nothing can compare with the dwarf Box, especially in light soils. On heavy low lands it suffers during winter and may, perhaps, be totally destroyed; in such situations grass may be used, though it is troublesome to keep in order.

Fig. 36.



EDGING KNIFE. This tool, fitted to a straight handle, is used for paring the edges of grass bordering walks, &c., and cutting the outlines of sods, which may be then readily raised by the spade.—*Rural Reg.*

EDWARDSIA. Six species. Half-hardy shrubs. Cuttings. Sandy peat.

EGG-BEARER. *Solanum origenum.*

EGG-SHELLS. See *Animat Matters.*

EGLANTINE. See *Sweet Briar.*

EGYPTIAN LOTUS. *Nymphaea lotus.*

EGYPTIAN THORN. *Acacia vera.*

EHRETIA. Eleven species. Stove evergreen shrubs and trees. Cuttings. Loam and peat.

EKEBERGIA capensis. Green-house evergreen tree. Cuttings. Loam and peat.

ELÆAGNUS. Seven species. Hardy or green-house trees and shrubs, except *E. latifolia*, which is a stove shrub. Layers or cuttings. Light soil.

ELAIS. Four species. Stove palms. Suckers. Rich sandy loam.

ELÆOCARPUS. Five species. Stove or green-house trees or shrubs. Cuttings. Loam and peat.

ELÆODENDRON. Five species. Green-house and stove evergreen shrubs. Cuttings. Loam and peat.

ELAPHRIUM glabrum. Stove evergreen tree. Cuttings. Peat and loam.

ELATE sylvestris. A stove palm. Suckers. Rich loam.

ELATER. See *Wire-worm.*

ELDER (Sambucus). Common black elder (*S. nigra*), of which there are several varieties, viz., black-berried, white-berried, green-berried, parsley-leaved, gold-striped, silver-striped, and silver-dusted.

ELEVATION. See *Altitude.*

ELICHRYSUM. Forty-five species. Chiefly green-house evergreen shrubs and deciduous perennials. Cuttings. Peat and sandy loam.

ELLIOTTIA racemosa. Half-hardy evergreen shrub. Layers. Sandy loam and peat.

ELLEBOCARPUS oleraceus. Stove fern. Division. Loam.

ELISENA longipetala. Stove bulb. Offsets. Sandy loam and leaf-mould.

ELM (Ulmus).

ELM BEETLE. See *Scolytus.*

EMBLICA. Two species. Stove evergreen shrubs. Cuttings. Peat and sand.

EMBOTHRIUM strobilinum. Green-house evergreen shrub. Cuttings. Sandy peat.

ENCELIA. Two species. Green-house evergreen shrubs. Cuttings. Loam.

ENDIVE (Cichorium endivia).

Varieties.—The green-curled, the only one cultivated for the main crops, as it best endures wet and cold; the white-curled, chiefly grown for summer and autumn; the broad-leaved, or Batavian, is preferred for soups and stews, but is seldom used for salads.

Soil and situation.—Endive delights in a light, dry, but rich soil, dug deep, as well for the free admission of its tap-root as to serve as a drain for any superabundant moisture. This should be especially attended to for the winter standing crops, for which, likewise, if the soil or *substratum* is retentive, it is best to form an artificial bed by laying a foot in depth of mould on a bed of brickbats, stones, &c., as excessive moisture, in conjunction with excessive cold, is in general fatal to this plant. The situation should be open, and free from the influence of trees.

Time and mode of sowing.—For a first crop about the middle of April, to be repeated in May, but only in small portions, as those which are raised before June, soon advance to seed. Towards the middle of this month the first main crop may be inserted; to be continued in the course of July, and lastly early in August; and in this month the main plantation is made. The seed is sown then in drills twelve inches apart, and about half an inch below the surface. The plants speedily make their appearance. When an inch in height they should be thinned to three or four inches apart: those taken away are too small to be of any service if pricked out. The bed must be kept clear of weeds from the first appearance of the plants until they are removed. To promote their arrival at a fit size for performing this operation, water should be given occasionally in dry weather.

When the larger seedlings have been transplanted, the smaller ones which remain may be cleared of weeds and have a gentle watering; by which treatment, in twelve or fourteen days, they will have attained a sufficient size to afford a second successional crop; and, by a repetition of this management, in general a third. The plants are generally fit for transplanting when of a month's growth in the seed-bed; but a more certain criterion is, that when of five or six inches' height they are of the most favourable size.

Planting.—They must be set in rows twelve or fifteen inches apart each way: the Batavian requires the greatest space. Some gardeners recommend them to be set in trenches or drills three or four inches deep. This mode is not detrimental in summer and dry weather; but in winter, when every precaution is to be adopted for the prevention of decay, it is always injurious.

Water must be given moderately every evening until the plants are established, after which it is not at all requisite, except in excessive and protracted drought. Those which are left in the seed-bed, if the soil is at all favourable, in general attain a finer growth than those that have been moved. In November some plants that have attained nearly their full size may be removed to the south side of a sloping bank of dry light earth, raised one or two feet behind: to be protected by

frames, mats, or thick coverings of litter, during severe and very wet weather; but to be carefully uncovered during mild dry days. The plants, in this instance, are not required to be further apart than six or eight inches. This plan may be followed in open days during December and January, by which means a constant supply may be obtained. Instead of being planted in the above manner on a terrace, it is sometimes practised to take the plants on a dry day, and, the leaves being tied together, to lay them horizontally in the earth down to the tip of the leaves; this accelerates the blanching, but otherwise is far more subject to failure.

As the number necessary for a family is but small, but few should be planted at a time.

Blanching.—About three months elapse between the time of sowing and the fitness of the plants for blanching. This operation, if conducted properly, will be completed in from ten to fourteen days in summer, or in three or four weeks in winter. To blanch the plants it is the most common practice to tie their leaves together, to place tiles or pieces of board upon them, or to cover them with garden-pots; whilst some recommend their leaves to be tied together, and then to be covered up to their tips with mould, making it rise to an apex, so as to throw off excessive rains. All these methods succeed in dry seasons; but in wet ones the plants, treated according to any of them, are liable to decay.

The one which succeeds best in all seasons is to fold the leaves round the heart as much as possible in their natural position; and being tied together with a shred of bass-mat, covered up entirely with coal-ashes in the form of a cone, the surface being rendered firm and smooth with the trowel. Sand will do, but ashes are equally unretentive of moisture, whilst they are much superior in absorbing heat, which is so beneficial in the hastening of the process. If the simple mode of drawing the leaves together is adopted to effect this etiolation, they must be tied very close, and, in a week after the first tying, a second ligature must be passed round the middle of the plant to prevent the heart-leaves bursting out. A dry afternoon, when the plants are entirely free from moisture, should be selected,

whichever mode is adopted for this concluding operation.

A very excellent mode is to spread over the surface of the bed about an inch in depth of pit-sand, and covering each plant with a small pot made of earthenware, painted both within and on the outside to exclude the wet—that worst hindrance of blanching. To avoid this, the pots should be taken off daily for a quarter of an hour, and their insides wiped dry. A common garden-pot will do if the hole be closely stopped; but a sea-kale pot in miniature, is to be preferred; and if made of zinc or other metal, it would be better, because not porous and admixive of moisture.—*Johnson's Gard. Almanack.*

To obtain Seed.—The finest and soundest plants should be selected of the last plantation, and which most agree with the characteristics of the respective varieties. For a small family three or four plants of each variety will produce sufficient. These should be taken in March, and planted beneath a south fence, about a foot from it and eighteen inches apart. As the flower-stem advances it should be fastened to a stake; or, if they are placed beneath palings,

Fig. 37.



by a string, to be gathered as the seed upon it ripens: for if none are gathered until the whole plant is changing colour, the first ripened and best seed will have scattered and be lost, so wide is the difference of time between the several branches of the same plant ripening their seed. Each branch must be laid, as it is cut, upon a cloth in the sun; and when perfectly dry, the seed beaten out, cleansed, and stored.

ENGINE. This name is applied to many contrivances for supplying water to plants.

1. *The pump-syringe, or syringe-engine*, (Fig. 37), can be supplied with water from a common bucket, from which it sucks the water through a perforated base. The handle is sometimes made to work like that of the common pump.

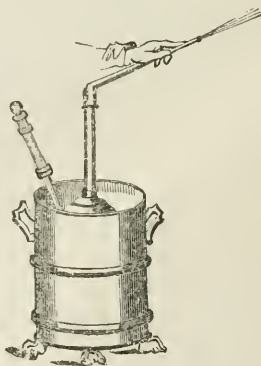
2. *The barrow watering-engine* (Fig. 38) is represented in the figure below. It will throw the jet of water to a distance of forty or fifty feet, or somewhat less if a rose is upon the end of the delivery-pipe. It holds from twenty to thirty gallons of water; but may be made, with a leather-hose attached, to communicate with a pond or other reservoir of water.

Fig. 38.



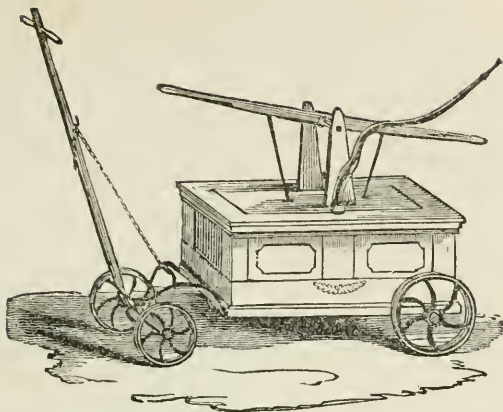
3. *The curved barrel-engine* (Fig. 39) is excellent; for the barrel, piston-rods, &c., being so constructed as to be turned on a lathe, they are so accurate that there is the least possible loss of power, either from unnecessary friction or from an imperfect vacuum.

Fig. 39.



Another garden engine of still greater power, is illustrated by the annexed drawing (Fig. 40); it is somewhat more costly than those in general use, but may be used for a variety of purposes, and in some cases might be used to

Fig. 40.



protect property from fire. They are of various patterns and power. Some of them, worked by a single arm, cast the water fifty to sixty feet high.

ENKIANTHUS. Two species. Green-house evergreen shrubs. Cuttings. Sandy loam and peat.

ENTADA. Five species. Stove evergreen climbers. Cuttings. Loam and peat.

ENTELEA. Two species. Green-house evergreen shrubs. Cuttings. Loam and sandy peat.

ENTRANCES. Upon these parts of a residence, which should give a first and appropriate impression, Mr. Whateley has these just remarks :

“The road which leads up to the door of the mansion may go off from it in an equal angle, so that the two sides shall exactly correspond ; and certain ornaments, though detached, are yet rather within the province of architecture than of gardening ; works of sculpture are not, like buildings, objects familiar in scenes of cultivated nature ; but vases, statues, and termini, are usual appendages to a considerable edifice : as such, they may attend the mansion, and trespass a little upon the garden, provided they are not carried so far into it as to lose their connexion with the structure. The platform and the road are also appurtenances to the house ; all these may, therefore, be adapted to its form ; and the environs will thereby acquire a degree of regu-

larity ; but to give it to the objects of nature, only on account of their proximity to others which are calculated to receive it, is, at the best, a refinement.

“Upon the same principles regularity has been required in the approach ; and an additional reason has been assigned for it, that the idea of a seat is thereby extended to a distance ; but that may be by other means than by an avenue ; a private road is easily known ; if carried through grounds, or a park, it is commonly very apparent ; even in a lane, here and there a bench, a painted gate, a small plantation, or any other little ornament, will sufficiently denote it. If the entrance only be marked, simple preservation will retain the impression along the whole progress ; or it may wind through several scenes distinguished by objects, or by an extraordinary degree of cultivation : and then the length of the way, and the variety of improvements through which it is conducted, may extend the appearance of domain and the idea of a seat, beyond the reach of any direct avenue. A narrow vista, a mere line of perspective, be the extent what it may, will seldom compensate for the loss of that space which it divides, and of the parts which it conceals.

“Regularity was, however, once thought essential to every garden and every approach ; and it yet remains in many. It is still a character denoting the neighbourhood of a gentleman’s

habitation; and an avenue, as an object in a view, gives to a house, otherwise inconsiderable, the air of a mansion. Buildings which answer one another at the entrance of an approach, or on the sides of an opening, have a similar effect; they distinguish at once the precincts of a seat from the rest of the country. Some pieces of sculpture, also, such as vases and termini, may perhaps now and then be used to extend the appearance of a garden beyond its limits, and to raise the mead in which they are placed above the ordinary improvements of cultivated nature. At other times they may be applied as ornaments to the most polished lawns; the traditional ideas we have conceived of Arcadian scenes correspond with such decorations; and sometimes a solitary urn, inscribed to the memory of a person now no more, but who once frequented the shades where it stands, is an object equally elegant and interesting.

"The occasions, however, on which we may with any propriety trespass beyond the limits of cultivated nature, are very rare; the force of the character can alone excuse the artifice avowed in expressing it."—*Whateley*.

EPACRIS. Eighteen species. Green-house evergreen shrubs. Cuttings.—Sandy peat.

EPIDENDRUM. Sixty-eight species. Stove epiphytes. Offsets. Peat and potsherds.

EPIGÆA. Two species. Hardy evergreen trailers. Layers. Sandy peat and loam.

EPILOBIUM. Seventeen species. Hardy herbaceous. Seed or division. Common soil.

EPIMEDIUM. Five species. Hardy herbaceous. Division. Sandy peat.

EPIPACTIS. Three species. Hardy orchids. Division. Sandy peat and loam.

EPIPHYLLUM. Eleven species. Stove evergreen cactaceæ. Cuttings. Sandy loam.

EPIPHYTES grow upon other plants, but, unlike parasites, do not extract from them nourishment.

ERANTHEMUM. Eleven species. Stove and green-house evergreen shrubs. Cuttings. Sandy peat.

ERANTHIS. Two species. Hardy tubers. Offsets. Sandy loam.

EREMURUS spectabilis. Hardy herbaceous. Division. Common soil.

ERIA. Twelve species. Stove epiphytes. Division. Peat and potsherds.

ERICA, Heath. Four hundred and ninety-five species, besides very many varieties. Most of them green-house, but a large number are hardy, and are all evergreen. Cuttings or layers. Sandy peat. See *Heath*.

ERIGERON. Forty species. Hardy herbaceous and annuals. Division or seed. Common soil.

ERINUS. Five species. Green-house evergreens, and hardy herbaceous. Division or seed. Sandy loam.

ERIOBOTRYA. Two species. Half-hardy evergreen trees. Cuttings, seed, and grafting on the white-thorn. Leaf and peat mould.

ERIOCEPHALUS. Five species. Green-house evergreen shrubs. Cuttings. Sandy loam and peat.

ERIOCOMA. Two species. Half-hardy evergreen shrubs. Cuttings. Common soil.

ERIODENDRON. Four species. Stove evergreen shrubs. Seed. Rich loam and sandy peat.

ERIOGONUM. Five species. Hardy herbaceous. Seed. Loam and peat.

ERIOLENÆA. Two species. Green-house evergreen shrubs. Cuttings. Sandy peat.

ERIOPHYLLUM. Two species. Hardy. Division. Common soil.

ERIOSOMA. A genus of insects nearly synonymous with *Aphis*.

E. tursaria. Poplar Louse.

E. lanigera. See *American Blight*.

ERIOSPERNUM. Eight species. Green-house bulbs. Suckers. Sandy peat.

ERIOSTEMON. Ten species. Green-house evergreen shrubs. Cuttings. Sandy peat and loam.

ERISMA floribunda. Stove evergreen shrub. Cuttings. Peat and loam.

ERITHALIS. Two species. Stove evergreen trees. Cuttings. Rich loam and peat.

ERNODEA montana. Half-hardy evergreen trailer. Division. Gravelly soil.

ERODIUM. Twenty-seven species. Chiefly hardy herbaceous. Division. Common soil.

ERPETION. Two species. Half-

hardy evergreen creepers. Division. Sandy peat.

ERYNGIUM. Thirty-four species. Chiefly hardy herbaceous. Division or seed. Common soil.

ERYTHRÆA. Eleven species. Chiefly hardy annuals. Seed or division accordingly, as they are annuals or perennials. Loam.

ERYTHRINA. Thirty-five species. Chiefly stove evergreen shrubs and trees. Cuttings. Loam, peat, and leaf-mould, in equal proportions.

E. crista-galli. Coral Tree. Is one of the most beautiful of this genus, and its cultivation in the open air is thus detailed by that excellent gardener, Mr. W. P. Ayres:—

“Cuttings of the young wood, taken off with a heel when about three inches long, and planted round the edge of a large pot, or singly in small ones, in sandy peat, and plunged in a brisk bottom heat, will root in the course of a few weeks. This is suitable for those cuttings which are taken from plants in heat, but cuttings from the open air will not bear such treatment. The transition to a close warm frame appears too much for them, and they become paralyzed; but if after being planted they are placed in a moderately warm frame until the cuttings are cicatrized, and then removed to a brisk bottom heat, they will root with great freedom.

“After the cuttings are rooted, they must be repotted into rich light compost, and encouraged to make robust growth. As it is indispensable that the plants should become strong before they are planted out, they must have at least one season’s cultivation in pots; the flower-buds must also be removed as soon as they are perceptible, so that the whole organizable matter may be concentrated in the young plant.

“In the spring of the second season, the ground may be prepared for the reception of the plants, and as the preservation in winter of the roots of all tender plants depends as much upon the dryness as upon the warmth of the soil, it will be advisable to give them an elevated but not an exposed situation; and where the subsoil is not porous, make it so artificially. Therefore, where it is necessary, excavate the natural soil to the depth of two feet, and in the bottom place a layer of

brick rubbish at least six inches thick; over that lay some small sticks, leaves, or moss, to prevent the soil from getting into the drainage, and in filling up, raise the bed six inches above the level of the surrounding soil—with a compost consisting of rich turfy loam, leaf-mould, and turfy peat, in the proportion of two parts of the former to one of each of the latter; to which sandstone or porous bricks, broken to the size of large eggs, may be added to the extent of one-eighth of the whole mass. This mixture will never become solid, on the contrary, it will always be permeable to both air and moisture, without any risk of becoming saturated with the latter. The plants in the first season may be planted eighteen inches apart; but in the third year half of them may be taken out to form a new plantation, and in the fifth or sixth year each plant when in flower will acquire an area of sixteen or twenty square feet. When large specimens for immediate effect are desired, four or five may be placed in juxtaposition.

“The best time to plant them out will be from the last week in May to the middle of June, as the ground will then be a little warm, and the plants will sustain no check.

“Towards the end of October the plants should be cut down, and the crown of each covered with a box, or flower-pot, filled with dry leaves, the whole being spread over with dry peat, leaf-mould, or saw-dust, to the depth of a foot, and then turfed over neatly. The latter will be found advantageous, especially if the sides of the bed have a sharpish inclination, as it will throw off much of the rain that would otherwise soak into the mould, and impair its protecting properties.

“In spring, when the covering is removed, the surface of the bed should be renewed to the depth of the roots with the above compost, the whole being afterwards covered two inches thick with sandy peat or leaf mould. This covering should be continued until the middle of June, or later if the weather requires it. Water during the growing season may be freely administered in dry weather, and if liquid manure is occasionally given it will add to the strength of the plants; but after they are in bloom the less water that falls on the bed the better it will be for

the preservation of the roots through the winter."—*Gard. Chron.* North of the Potomac it will be safer to remove the *Erythrina c.-galli* in autumn to some sheltered situation, where it may be kept in nearly a dry or dormant state until the spring, when it may again occupy its position in the open air.

ERYTHROLÆNA conspicua. Hardy biennial. Seed. Rich loam.

ERYTHRONIUM. Four species. Hardy bulbs. Offsets. Common soil, with a little peat.

ESCALLONIA. Seven species. Green-house and half-hardy evergreen shrubs. Cuttings. Peat, sand, and loam.

ESCHALLOT or *SHALLOT*. *Allium ascalonicum*. Of this there are the *common*, and the *long-keeping*, the last continuing good for two years. Both have a stronger taste than the onion, yet not leaving that odour on the palate which the latter is accustomed to do, it is often preferred and employed in its stead, both in culinary preparations, and for eating in its natural state.

Time and Mode of Propagation.—Each offset of the root will increase in a similar manner as its parent. The planting may be performed in October and November, or early in the spring, as February, March, or beginning of April. The first is the best season, especially if the soil lies dry, as the bulbs become finer. If the smallest offsets are employed for planting, they never become mouldy in the ground, and they are never injured by the most intense frosts.

They are to be planted on the surface, six inches asunder each way, in beds not more than four feet wide, some very rich mould being placed beneath them, and a little raised on each side to support them until they become firmly rooted, when it must be entirely removed by the hoe, and a strong current of water from the watering pot. The compost laid beneath the offsets may consist of a mixture of well-decayed hot-bed dung and soot, which is very favourable to their growth, and is a preservative from the maggot.

Cultivation.—The only attention they subsequently require is to be kept clear of weeds. Some may be taken up as wanted in June, July, and August, but not entirely for storing until the leaves

are withered, which takes place during the last-named month, when, being carefully dried and housed, they will keep until the following spring. Care must be taken that they are gradually dried in an airy situation, shaded from the meridian sun, which would cause them to wrinkle; as also to store them in dry weather.

ESCHSCHOLTZIA. See *Chryseis*.

ESPALIER, is a tree trained to a trellis instead of a wall, and though the fruit it bears is not quite equal to that borne by a tree of the same variety trained against the wall, yet it is far superior to that borne on either dwarf or full standards. Of this the causes obviously are, that the fruit and leaves are more fully supplied with sap, and more perfectly exposed to the light and warmth of the sun. Some gardeners object to their introduction into the kitchen garden on the plea that they deprive the under crops of air and light, but if confined to the borders of the main walks, the shelter they afford to those crops is more than commensurate to the slight interruption suggested. In addition, they are highly ornamental, and greatly improve the aspect of the kitchen garden. Espalier rails should run parallel with the walks, and at four feet distance from them; not higher than five feet; neat, and if made of wood, tarred, and the ends which are fixed in the ground charred; though blocks of stone sunk into the ground, with iron sockets or bases to receive those ends, are still better.

Gooseberries and *Currants* are highly improved by being trained as espaliers, and may be so grown along borders near the side walks of the kitchen garden. For these the trellis must be not higher than three feet from the ground, and for the purpose stakes about four inches in circumference, and thus arranged, are very suitable.

Fig. 41.



Various suggestions have been made for altering the form of espalier trellises, but let the gardener never adopt any that declines from the perpendicular.

The smallest approach to the horizontal increases the radiation of heat from the trees, and increases, consequently, the cold they have to endure at night. It is not one of the least advantages of training gooseberries and currants as espaliers, that it facilitates the protecting them with mats.

ETIOLATION. See *Blanching*.

EUCALYPTUS. Fifty-three species. Green-house evergreen trees. Cuttings. Peat, loam, and sand.

EUCHARIDIUM concinnum. Hardy annual. Seed. Common soil.

EUCHILUS obcordatus. Green-house evergreen shrub. Cuttings. Loam, peat, and sand.

EUCHROMA. Two species. Hardy; one perennial, the other annual. Seed. Common soil, with a little peat.

EUCLEA. Two species. Green-house evergreen shrubs. Cuttings. Peat and loam.

EUCMIS. Seven species. Green-house bulbs. Offsets. Rich loam.

EUCROSIA bicolor. Green-house bulb. Offsets. Common light soil.

EUGENIA. Twenty-eight species. Stove evergreen shrubs. Cuttings. Loam and peat.

EULOPHIA. Eight species. Green-house and stove orchids. Division. Peat and loam.

EUMERUS. A genus of predatory flies.

E. æneus, Brassy Onion Fly, is thus described by Mr. Curtis:—

“The maggots are very rough, from a multitude of short spines or rigid bristles, which cover their skins, especially towards the tail, ferruginous or brownish. The fly itself is of a reddish ochre colour, freckled with dark brown, and there are two spiny processes like short horns upon the thorax, in the female at least. It is densely clothed with short hairs, thickly and distinctly punctured, and of an olive-green colour, with a brassy tinge; the antennæ are entirely black, the seta naked: the face is very hairy, simply convex and silvery white; eyes dark brown and slightly pubescent; rostrum very short; thorax with two whitish lines down the back. The maggots of this fly do not seem to be confined to the onion, for I bred one in the middle of May from cabbage roots, and specimens have been taken flying about hedges in June and July, in the neighbourhood of London and

Bristol. As it often happens, the female has not been observed depositing her eggs; the spot that she selects is therefore yet unknown. Drought does not suit them.”—*Gard. Chron.*

EUNOMIA oppositifolia. Half-hardy herbaceous. Cuttings. Sandy loam and peat.

EUONYMUS. Eighteen species. Chiefly hardy evergreen shrubs. Seed or cuttings. Common soil.

EUPATORIUM. Fifty species, embracing hardy, green-house, and stove herbaceous, and perennial plants. Seed. Peat and loam.

EUPHORBIA. One hundred and fifty-two species. Chiefly hardy, green-house and stove evergreens. Division or seed. Common soil.

“*E. splendens* is the most striking species. It is a stove evergreen shrub. It should be repotted early in spring, or even in the winter, if the pot is full of roots. Although it does not require so much water in winter, yet you must not keep it then quite dry, for it is always growing.”—*Gard. Chron.*

E. jaquiniflora is also a very beautiful species, producing a profusion of deep orange coloured flowers in a wreath like form.

EURYA. Two species. Green-house evergreen shrubs. Cuttings. Peat and loam.

EURYALE ferox. Stove aquatic. Seed.

EURYCLES. Four species. Stove bulbs. Seed and offsets. Sandy loam and leaf-mould.

EUSTEGIA hastata. Green-house evergreen trailer. Cuttings. Peat and loam.

EUSTOMA silenifolia. Hardy annual. Seed. Common soil.

EUSTREPIHUS. Two species. Green-house evergreen twiners. Cuttings. Sandy peat.

EUTAXIA. Three species. Green-house evergreen shrubs. Cuttings. Loam and peat.

EUTHALES trinervis. Green-house herbaceous. Cuttings. Loam and peat.

EUTHAMIA. Two species. Hardy herbaceous. Cuttings. Loam and peat.

EUTOCA. Five species. Hardy annuals and biennials. Seeds. Sandy soil.

EUXENIA grata. Green-house evergreen shrub. Cuttings. Peat and loam.

EVENING FLOWER. *Hesperus*.

EVENING PRIMROSE. *Oenothera*.

EVERGREENS are such plants as do not shed all their leaves at any one season of the year.

EVERGREEN THORN. *Cratægus pyracantha*.

EVERLASTING. *Gnaphalium*.

EVERLASTING PEA. *Lathyrus latifolius*.

EVODIA *triphylla*. Stove evergreen shrub. Cuttings. Sandy loam.

EVO LV L U S. Eleven species. Chiefly stove annual trailers; two are hardy, and two evergreens. The last propagated by division; others by seed. Common soil.

EXCRESCENCE. "Independent of Galls, which are caused by the punctures of insects, and the swellings which always accompany Canker, the excrescences which injure the gardener's crops are very few. That which appears above the point of union between the scion and stock, is caused by the former being the freer grower of the two, and is a warning which should be remembered, for it curtails the longevity of the tree, the supply of sap gradually becoming inefficient.

"The excrescences which occur upon the branches of some apples, as those of the codling and June-eating, cannot be looked upon as disease, for they arise from congeries of abortive buds, which readily protrude roots if buried in the soil, making those among the very few apples which can be propagated by cuttings. Of a similar nature are the huge excrescences so prevalent on aged oaks and elms. Bulbous excrescences are formed upon the roots of many plants if compelled to grow upon a soil drier than that which best suits them. This is the case especially with two grasses, *Phleum pratense* and *Alpecurus geniculatus*, and is evidently a wise provision of nature to secure the propagation of the species, for those bulbs will vegetate long after the remainder of the plant has been destroyed by the excessive dryness of the soil.

"On the free performance of this function of plants their health is dependent in a very high degree: and I believe that half the epidemics to which they are subject arises from its derangement. That consequence of the clubbing of the roots of the brassica tribe, called fingers and toes, arises, I consider, entirely from it. In the drought of

summer, when the moisture supplied to a club-rooted cabbage by its root does not nearly equal the exhalation of its foliage, to supply this deficiency the plant endeavours, by forming a kind of spurious bulbous root, to adapt itself to the contingency."—*Princ. of Gardening*.

EXTRAVASATED SAP. "Under this general name, I purpose to include the consideration of gumming, bleeding, and other injurious affections under which plants occasionally labour, on account of their sap escaping from the properly containing vessels. The extravasation proceeds either from the alburnum or from the inner bark and may arise from five causes.

"1. The acrid or alkaline state of the sap, which has been considered already, when treating of the canker.

"2. From plethora or excessive abundance of the sap.

"3. From the unnatural contraction of the circulatory vessels.

"4. From wounds.

"5. Heat and dryness.

"1. With regard to the alkaline state of the sap, it may be observed, additionally, that the excessive alkaline quality of the sap, imparting to it the power of destroying the fibre of its containing vessels, is placed on the basis of chemical experiment. A weak alkaline solution dissolves woody fibre without alteration; and it may be thrown down again by means of an acid. By this property we are enabled to separate wood from most of the other vegetable principles, as few of them are soluble in weak alkaline leys.

"It is true, that the vital principle may counteract powerfully this chemical action; but it will not control the corrosive effect of an active agent in excess, if repeated for any length of time. The blood of the human system contains, when in a healthy state, a portion of common salt; yet, if this saline constituent is in excess, it induces inflammation and organic derangement.

"2. Plethora is that state of a plant's excessive vigour in which the sap is formed more rapidly than the circulatory vessels can convey it away. When this occurs, rupture must take place, for the force with which it is propelled during circulation, and consequently, the force acting to burst the vessels during any check, is very much greater than could

have been expected, before Mr. Hales demonstrated it by experiment.

"Now, we know that a much less pressure than any of those above mentioned would be capable of bursting the delicate membranes of any of their exterior descending sap vessels, and it is in such outer ducts that the injury first occurs. When one exterior vessel is ruptured, that next beneath it, having the supporting pressure removed, is enabled to follow the same course at the same locality; and in proportion to the length of the time that the sap continues in excess, is the depth to which the mischief extends, and the quantity of sap extravasated.

"If the extravasation proceeds from this cause, there is but one course of treatment to be pursued; sever one of the main roots to afford the tree immediate relief, and reduce the staple of the soil, by removing some of it, and admixing less fertile earthy components, as sand or chalk. This must be done gradually, for the fibrous roots that are suited for the collection of food from a fertile soil are not at once adapted for the introsusception of that from a less abundant pasturage. Care must be taken not to apply the above remedies before it is clearly ascertained that the cause is not an unnatural contraction of the sap vessels, because, in such case, the treatment might be injurious rather than beneficial. I have always found it arising from an excessive production of sap, if the tree, when afflicted by extravasation, produces at the same time super-luxuriant shoots.

"3. Local contractions of the sap vessels.—If the extravasation arises from this cause, there is usually a swelling of the bark immediately above the place of discharge.

"I had a cherry tree in my garden, in Essex, of which the stock grew very much less freely than the graft, consequently, just above the place of union, a swelling resembling a wen extended round the whole girth of the tree, from which swelling gum was continually exuding. In the stem below it, I never observed a single extravasation. In a case such as this, the cultivator's only resource is to reduce cautiously the amount of branches, if the bleeding threatens to be injuriously extensive, otherwise it is of but little consequence, acting like temporary discharges of

blood from the human frame, as a relief to the system.

"4. The extravasation of the sap from a wound is usually the most exhausting, and as the wound, whether contused or not, is liable to be a lodgment for water and other foreign bodies opposed to the healing of the injured part, the discharge is often protracted. This is especially the case if the wound be made in the spring, before the leaves are developed, as in performing the winter pruning of the vine later than is proper. In such case, the vine always is weakened, and in some instances it has been destroyed. The quantity of sap which may be made to flow from some trees is astonishing, especially in tropical climates. Thus, from a cocoa-nut palm, from three to five pints of sap will flow during every day for four or five successive weeks. The best mode of checking such exudations, is by placing a piece of sponge dipped in a solution of sulphate of iron upon the discharging place, covering the sponge with a piece of sheet-lead, and binding it on firmly. The sulphate acts as a styptic, promoting the contraction of the mouths of the vessels; the sponge encourages cicatrization, and the lead excludes moisture.

"5. Heat attended by dryness of the soil, as during the drought of summer, is very liable to produce an unnatural exudation. This is especially noticeable upon the leaves of some plants, and is popularly known as honey-dew. It is somewhat analogous to that outburst of blood, which in such seasons is apt to occur to man, and arises from the increased action of the secretory and circulatory system, to which it affords relief. There is this great and essential difference, that, in the case of the plants, the extravasation is upon the surface of the leaves, and consequently in proportion to the abundance of the extruded sap are their respiration and digestion impaired.

"Azaleas sometimes, but rarely, have the impubescence on their leaves, especially on their lower surface, beaded as it were with a resinous exudation. This can scarcely be called a disease. It is never found but upon plants that have been kept in a temperature too high, and in a soil too fertile. It is an effort to relieve the surcharged vessels, and occurs in various forms in other plants.

"The honey-dew was noticed by the ancients, and is mentioned by Pliny by the fanciful designation of the 'sweat of the heavens,' and the 'saliva of the stars,' though he questioned whether it is a deposition from the air, purging it from some contracted impurity. More modern philosophers have been quite as erroneous and discordant in their opinion relative to the disease's nature. Some, with the most unmitigable asperity, declare that it is the excrement of aphides. Others as exclusively maintain that it is an atmospheric deposit, and a third party consider that it arises from bleeding, consequent to the wounds of insects. That there may be a glutinous saccharine liquid found upon the leaves of plants arising from the first and third named causes is probable, or rather certain; but this is by no means conclusive that there is not a similar liquid extravasated upon the surface of the leaves, owing to some unhealthy action of their vessels. It is with this description of honey-dew that we are here concerned. The error into which writers on this subject appear to have fallen, consists in their having endeavoured to assign the origin of every kind of honey-dew to the same cause. Thus the Rev. Gilbert White seems (*Naturalist's Calendar*, 144) to have had a fanciful and comprehensive mode of accounting for the origin of honey-dew: he tells us, June 4th, 1783, vast honey-dews this week. The reason of this seems to be, that in hot days the effluvia of flowers are drawn up by a brisk evaporation, and then in the night fall down with the dews with which they are entangled. The objection urged to this theory by Curtis (*Trans. Linn. Soc.* vi. 82) is conclusive. If it fell from the atmosphere, it would cover every thing on which it fell indiscriminately; whereas we never find it, but on certain living plants and trees; we find it also on plants in stoves and green-houses with covered glass.

"Curtis had convinced himself that the honey-dew was merely the excrement of the aphides, and he supported his theory with his usual ability, although he justly deemed it a little 'wonderful extraordinary' that any insect should secrete as excrementitious matter, sugar; he even thought it possible, if the ants, wasps, and flies, could be prevented from devouring the honey-

dew, 'almost as fast as it was deposited,' to collect it in considerable quantities, and convert it into the choicest sugar and sugar-candy.'

"The bees, however, he found totally disregarded the honey-dew which came under his observation. With the opinion of Mr. Curtis I do not agree, any more than does the Abbé Boissier de Sauvages, who, in a memoir read before the Society of Sciences at Montpellier, gives an account of 'a shower of honey-dew,' which he witnessed under a lime tree in the king's garden at Paris.

"The various successful applications of liquids to plants, in order to prevent the occurrence of the honey-dew and similar diseases, would seem to indicate that a morbid state of the sap is the chief cause of the honey-dew, for otherwise it would be difficult to explain the reason why the use of a solution of common salt in water applied to the soil in which a plant is growing, can prevent a disease caused by insects. But if we admit that the irregular action of the sap is the cause of the disorder, then we can understand that a portion of salt introduced in the juices of the plant would naturally have a tendency to correct or vary any morbid tendency, either correcting the too rapid secretion of sap, stimulating it in promoting its regular formation, or preserving its fluidity. And that by such a treatment the honey-dew may be entirely prevented, I have myself often witnessed in my own garden, when experimenting with totally different objects. Thus I have seen plants of various kinds, which have been treated with a weak solution of common salt and water, totally escape the honey-dew, where trees of the same kind growing in the same plot of ground not so treated, have been materially injured by its ravages. I think, however, that the solution which has been sometimes employed for this purpose is much too strong for watering plants. I have always preferred a weak liquid, and I am of opinion, that one ounce of salt (chloride of sodium) to a gallon of water is quite powerful enough for the intended purpose. I am in doubt as to the correctness of Knight's opinion, as to the mere water having any material influence in the composition of such a remedy, since I have noticed that standard

fruit trees, around which, at a distance of six or eight feet from the stem, I had deposited at a depth of twelve inches a quantity of salt to promote the general health and fruitfulness of the tree, according to the manner formerly adopted to some extent in the cider countries for the apple orchards, that these escaped the honey-dew which infected adjacent trees, just as well as those which had been watered with salt and water."—*Johnson's Principles of Gardening*.

EYEBRIGHT. *Euphrasia*.

FABA vulgaris. See *Bean*.

FABRICIA. Four species. Green-house evergreen shrubs. Cuttings. Loam, peat, and sand.

FAGELIA bituminosa. Green-house evergreen twiner. Cuttings. Sandy loam and peat.

FAGRÆA. Two species. Stove evergreen trees. Cuttings. Loam, sand, and peat.

FAGUS, Beech tree. Four species. Seed, budding, and grafting. Chalky loam.

FALKIA repens. Green-house evergreen creeper. Cuttings. Peat and loam.

FALL of the **LEAF.** Dr. Lindley thus explains this phenomenon.

"In the course of time a leaf becomes incapable of performing its functions; its passages are choked up by the deposit of sedimentary matter; there is no longer a free communication between its veins and the wood and liber. It changes colour, ceases to decompose carbonic acid, absorbs oxygen instead, gets into a morbid condition, and dies; it is then thrown off. This phenomenon, which we call the fall of the leaf, is going on the whole year. Those trees which lose the whole of their leaves at the approach of winter, and are called deciduous, begin, in fact, to cast their leaves within a few weeks after the commencement of their vernal growth; but the mass of their foliage is not rejected till late in the season. Those, on the other hand, which are named evergreens, part with their leaves much more slowly; retain them in health at the time when the leaves of other plants are perishing; and do not cast them till a new spring has commenced, when other trees are leafing, or even

later. In the latter class, the functions of the leaves are going on during all the winter, although languidly; they are constantly attracting sap from the earth through the spongelets, and are therefore in a state of slow but continual winter growth.

"It usually happens that the perspiratory organs of these plants are less active than in deciduous species."—*Theory of Horticulture*.

With all due deference to Dr. Lindley, whose scientific acquirements are of a high order, we cannot admit that his theory in this particular is entirely satisfactory. Nature has ordained that vegetables shall perform certain functions, and that which may appear to be the cause of change, is in fact only a result of the action of established laws.

FALLOWING, beyond all doubt, is needless where there is a due supply of manure, and a sufficient application of the spade, fork, and hoe to the soil. Fallowing can have no other beneficial influence than by destroying weeds, aiding the decomposition of offensive exuviae, exposing the soil to the disintegrating influence of the air, and accumulating in it decomposing matter. Now all these effects can be produced by judicious stirrings and manurings. Mr. Barnes, gardener to Lady Rolle, at Bicton, bears confirmatory testimony to this opinion, founded on many years' experience.

"To rest or fallow ground for any length of time is only loss of time and produce; more benefit will be obtained by trenching and forking in frosty or hot sunny weather, in a few days, than a whole season of what is erroneously called rest or fallow. Trench, fork, and hoe; change every succeeding crop; return to the earth all refuse that is not otherwise useful in a green state, adding a change of other manures occasionally, especially charred refuse of any kind, at the time of putting a crop into the ground. Every succeeding crop will be found healthy and luxuriant, suffering but little either from drought, too much moisture, or vermin."—*Principles of Gardening*.

The practice of fallowing appears to have been one of great antiquity. Virgil (who flourished his grey-goose quill two thousand years ago), thus alludes to it in his *Georgics*:

“Both these unhappy soils the swain
forbears,
And keeps a Sabbath of alternate years,
That the spent earth may gather heart
again,
And bettered by cessation, bear the
grain,
At least where vetches, pulse, and
tares, have stood,
And stalks of lupines grew (a stubborn
wood),
Th’ ensuing season, in return may bear
The bearded product of the golden
year.”

FRAMEA *odoratissima*. Stove
evergreen shrub. Cuttings. Turfy
loam and sandy peat.

FARM-YARD MANURE. See
Dung.

FARSETIA. Six species. *F. cheiranthifolia* is a hardy annual; the others are half-hardy evergreen shrubs. The first by seed, the shrubs by cuttings. Light loam.

FEABERRY, a local name for the
Gooseberry.

FEATHERS. See *Animal Matters*.
FEBRUARY.

KITCHEN GARDEN.

Except in the remote south, the outdoor operations of the gardener are almost suspended. Nearly all that he can do is to provide manure, prepare rods and poles for peas and beans, labels for his plants, and if the weather admit, trench those compartments of his grounds which require such treatment. Such labour and the preparation of hot-beds for forcing, may profitably employ his time. Cabbage, Eggplants, Tomatoes, Peppers, &c., are now sown in hot-beds for early planting. If the weather be very cold delay awhile, nothing can be gained by setting them during strong frost. Farther south labour has now commenced in earnest. In the Carolinas and southward, it is perhaps one of the most active months in horticultural operations. Beans and Peas are planted; Cabbage and Cauliflower sown, and plants from previous sowings transplanted. Lettuce plants from the autumn seed beds are set out. Spinach is sown, also Radishes, Carrots, Parsnips, Beets; Asparagus beds are dressed. In short, all the early operations of the garden are now performed.

ORCHARD.

Apples, finish pruning, b. *Apricots*, finish pruning, b. — *Blossoms* of early wall fruit, shelter in frosty and windy weather. — *Dress* and fork over the earth of the borders, &c. — *Figs*, prune. — *Forcing*, continue. (See Jan.) — *Gooseberries*, finish pruning, b. — *Grafting*, commence, if mild, e. — *Grafts*, collect ready for use. — *Hot-house*, forcing continue. (See Jan.) — *Layers*, make of *Figs*, *Vines*, *Filberts*, *Mulberries*, and *Muscle Plums*, the last for stocks. — *Manures*, apply where required. — *Moss*, on trees, destroy with brine. (See Jan.) — *Pears*, finish pruning; graft, e. — *Plums*, finish pruning; graft, e. — *Pruning*, finish generally. — *Raspberries*. — *Standards*, finish pruning. — *Strawberries*, clear and spring dress; force in hot-beds, giving air abundantly, and covering the glasses with mats at night. — *Trench* ground for planting. — *Vines* may still be pruned, b.; cuttings, plant.

HOT-HOUSE.

Air, admit freely during midday, when weather permits. — *Bulbs*, and other dry roots for succession, plant, b. — *Bark Beds* attend to. (See Jan.) — *Cherries*, in blossom, shade when sun is bright; disbud as required: day temp. keep about 60°; night 45°. — *Earth* of borders, &c., stir once a week. — *Figs* require a day temp. about 60°. — *Flowering* shrubs in pots, introduce for succession. — *Heat*, keep up; plants becoming more sensitive. — *Kidney Beans*, continue to sow in boxes. (See Jan.) — *Labels*, renew where required. — *Leaves*, keep cleaned; decayed and weeds clear away constantly. — *Liquid Manure* apply to the roots of fruit trees in forcing, especially *Vines* and *Figs*. — *Peaches*, and other fruits in blossom, should not now be syringed; disbud; thin when too thick, and as large as peas; day temp. 60°. — *Pines*, water moderately; (crowns of) remove from bark bed to pots; regulate succession by changing their pots, &c. — *Steam* (if employed) may be admitted almost daily. — *Strawberries*, in pots, introduce for succession. — *Thermometer*, for most stove plants, may be at 70° during midday. — *Tobacco* fumigations give weekly, or oftener if insects appear. — *Vines*, treat as in Jan.; do not syringe whilst in blossom; prune bunches; day temp.

70°.—*Water*, give more freely than last month; keep in open pans constantly.—*Watch* sedulously for the green fly and red spider.

GREEN-HOUSE.

Air, admit freely whenever practicable; it is now still more important than in winter.—*Dead Wood*, cut away as it appears.—*Earth*, give fresh generally.—*Head down* shrubs irregularly grown.—*Heat*, give as necessary, to keep the temp. above 32°.—*Labels*, renew where wanted.—*Leaves*, keep clean, and remove those decayed.—*Pruning of Oranges*, &c., complete.—*Shelter*, by putting mats over the glass in severe weather.—*Shift* into large pots where required.—*Water* more often than last month, wherever needed, but only a little at a time.

FEDIA cornucopia. Hardy annual. Seed. Common soil.

FENCES are employed to mark the boundary of property, to exclude trespassers, either human or quadrupedal, and to afford shelter. They are either live fences, and are then known as *hedges*, or dead, and are then either *banks*, *ditches*, *palings*, or *walls*; or they are a union of those two, to which titles the reader is referred.

The following is the English law on the subject:—

In the eye of the law a hedge, fence, ditch, or other inclosure of land, is for its better manuring and improvement; and various remedies are therefore provided for their preservation.

The common using of a wall separating adjoining lands belonging to different owners is *primâ facie* evidence that the wall, and the land on which it stands, belongs in equal moieties to the owners of those lands as tenants in common. (*Cubitt v. Porter*, 8 B. & C. 257.)

One of such tenants in common of a wall or hedge may maintain an action of trespass against the co-tenant for injuring the wall or for grubbing up the hedge, but not for clipping the latter. (*Voyce v. Voyce*, Gow. 201.)

If a field be fenced with a bank and ditch, it is not a necessary consequence that his ditch extends eight feet from the interior line of the bank's foot, viz., four feet for the base of the bank, and four feet for the ditch; and the owner has no right to cut into his neighbour's

field to widen the ditch beyond the proof of its ancient width. (*Vowles v. Miller*, 3 Taunton, 137.)

Where two fields are separated by a hedge and ditch, the hedge, *primâ facie*, belongs to the owner of the field in which the ditch is not. If there are two ditches, one on each side the ditch, evidence must prove acts of ownership over the hedge to show to whom it belongs. (*Guy v. West*, 2 Selwyn, N. P. 1287.)

The owner of the wall or hedge is bound to repair it; and if any injury arises from its being out of repair, an action on the case lies.

Any one stealing or cutting, breaking or throwing down, with the intent to steal, any fence, post, pales, rail, stile, or gate, or any part thereof, may be fined by a justice of the peace the amount of the injury done, and a fine not exceeding 5*l*. Committing the same offence a second time renders the offender liable to twelve months' imprisonment and a whipping.

Stealing metal garden-fencing is a felony. In America each State has its own peculiar laws on this as on other subjects. In Pennsylvania, by an Act of 1700, entitled "*An act for the regulating and maintaining of Fences*," it was provided that "all cornfields and grounds kept for inclosures within the said province and counties annexed, shall be well fenced with fence at least five feet high, and close at the bottom, &c." By an Act of 1729, it was provided that "to prevent disputes about the sufficiency of fences, all fences shall be esteemed lawful and sufficient, though they be not close at the bottom, so that the distance from the ground to the bottom thereof, exceed not nine inches; and that they be four feet and a half high, and not under." Both acts are operative in certain counties only.—See *Purdon's Digest*.

Ornamental fences for enclosing gardens, yards, &c., are almost as diversified as the ideas of beauty in the human mind. "The impression, on viewing grounds laid out with some pretension to taste, is governed in a degree, by the style and character of the surrounding fence. It is a great mistake to suppose the most elaborate (and of course costly) are the most pleasing; yet acting on this supposition, we see exhibited fences which appear to have

been planned as if to show the amount of money which could be thus expended, and after all, they rather disgust than please.

Fig. 42.



Fig. 43.

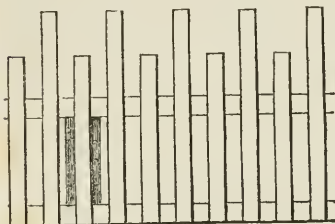
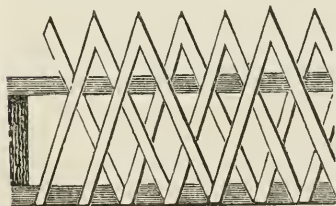


Fig. 44.



"The figures 42, 43, 44, illustrate three simple designs, formed by straight slats or pales, and therefore of the least expense; they are readily executed, and agreeable from their simplicity. The colour which should be used, is of course a matter of taste; white is generally preferred, though dark shades, even jet black, are the most pleasing to

many; for ourselves, we should choose the latter, though it be not the best, so far as the preservation of the wood is concerned."—*Rural Reg.*

FENNEL (*Anethum Feniculum*) will flourish in almost any soil or situation: in a dry soil it is longest-lived. It is propagated both by offsets, partings of the root, and by seed; all of which modes may be practised any time between the beginning of February and the end of April. The best season, however, for sowing, is autumn, soon after the seed is ripe, at which time it may also be planted with success.

Insert the plants a foot apart, and the seed in drills, six or twelve inches asunder, according as it is intended that the plants are to be transplanted or to remain.

When advanced to the height of four or five inches, if they are intended for removal, the plants are pricked out eight inches apart, to attain strength for final planting in autumn or spring. Water must be given freely at every removal, and until established, if the weather is at all dry.

They require no other cultivation than to be kept free from weeds; and the stalks of those that are not required to produce seed to be cut down as often as they run up in summer. If this is strictly attended to, the roots will last for many years; but those which are allowed to ripen their seed seldom endure for more than five or six.

FENNEL-FLOWER. *Nigella*.

FENUGREK. *Trigonella*.

FERNELIA. Two species. Stove evergreen shrubs. Cuttings. Turfy loam and peat.

FERNS from the tropics present to us some of the most beautiful forms to be found in the vegetable world, and now very generally are a portion of collections of exotic plants. Mr. J Henderson, the florist, gives the following directions for their cultivation:—

"Procure a number of small octagonal-shaped hand-glasses about six inches in diameter, (more or less,) according to the size of the pots intended to sow the seeds in, the side walls of each being high enough to admit the pot to stand underneath without touching the glass.

"**Pots.**—These are to be about half filled with well broken potsherds, the finest at top; then fill to within half an inch of the rim with heath-mould, sifted

through a fine sieve. Level the surface of the mould, and water it freely with a very fine rose; let the pot stand a few minutes till the water is absorbed, and then carry it to a dry part of the house.

"Sowing.—Place the papers containing the fern seed for a minute or two on the flue, or some other place where they will become thoroughly dry; then open the paper and carefully dust the spores (seed) over the surface of the moist earth, taking care not to sow too thick. The pots may then be placed in a shady place on a level surface of wood or stone, to prevent the intrusion of worms, and covered with the hand-glass. The germination of ferns differs in different species; some require six weeks and more; and if during that time the surface of the earth in the pots should appear dry, a very slight watering must be given with the fine rose.

"After-culture.—It will be necessary to examine the surface of the earth frequently with a pocket microscope, in order to discover any mouldiness or minute algæ that may appear; such appearances indicate that too much water has been used; and in that case the glasses should be taken off for a short time, and the pots removed to the full light.

"If after this the mouldiness continue to spread, a knife may be introduced between the pot and the earth, and the latter slightly raised up so as to allow the moisture to drain off.

"As the seedlings acquire strength, they may be removed from the shade to places where they will have more light; but they must not be exposed to the full sun in summer as long as they are under the hand-glass. In winter, however, when the sun is less powerful, all those seedlings that have perfected, or nearly perfected their first fronds, may be exposed to the full light; this will prevent the spreading of mouldiness, which the moist atmosphere under the glasses is so apt to produce at this season of the year.

"When it happens that from too thick sowing the seedlings are much crowded, they should be thinned out carefully with the point of a pen-knife, taking patches of from six to a dozen plants and transferring them to another pot, prepared in all respects as if for sowing spores. In planting these, a

slight depression should be made with the point of the pen-knife on the surface of the mould in the new pot, and the patch inserted, taking care not to cover any part of the plants with the earth. They may stand about a quarter of an inch from patch to patch; and when the operation is completed, water the seedlings and place the pot under the glass.

"These transplanted seedlings will frequently succeed better than those in the seed-pots; indeed with very slow growing seedlings it is frequently advisable to transfer the whole to another pot, as they will generally root better in the fresh than in the old earth.

"When the seedlings have fully developed their perfect fronds, (and not till then,) the glasses may be withdrawn. The pot with the seedlings should then be placed in a perfectly shaded place, and more frequently supplied with water.

"They may remain in the seed-pots until three or four fronds are produced, when it will be advisable to shift them into other pots and place them at wider distances.

"Many ferns grow very slowly while in the state of primary frond, and require many months before their perfect fronds are developed.

"It is chiefly for these slow growers that glasses are required; others, such as most of the *Gymnogrammas*, some species of *Nephrodium*, *Pteris*, &c., come up readily in open pots, but with those which require from nine to eighteen months to produce their second fronds, glasses are indispensable.

"Great care must be taken not to allow worms to get into the pots, as they will in a very short time destroy the whole crop. The only way to get rid of these pests, is to place the pot with the glass over it, on a tolerably hot flue, or some other well-heated surface, when the heat ascending through the earth in the pot will drive the worm out.

"It may not be amiss to observe here, that in collecting spores for reproduction, it is better to select a frond on which the thecæ (seed vessels) have not opened; if they have changed to a brown colour, and one or two have opened, they will be in the best possible state for transmission to a distance; portions of the frond should then be in-

closed in the papers, which should be well secured and kept perfectly dry."—*Gard. Chron.*

FERRARIA. Eight species. Green-house and hardy bulbs. Offsets and seeds. Sandy loam and peat.

FICARIA. Three species. Hardy tubers, tubers, shaded. Common soil.

FICUS. Fig Tree. Seventy-seven species. Chiefly green-house and stove evergreen trees and shrubs. Cuttings. Light rich loam.

FIELDIA australis. Green-house evergreen creeper. Cuttings. Loam and peat.

FIG MARIGOLD. *Mesembryanthemum.*

FIG. *Ficus carica.*

Varieties for open walls, and time of ripening.—Brown Ischia, Large White Genoa, and Green Ischia, (August.) Brown Naples, Brunswick, White Marseilles, (September.) Black Provence, Yellow Ischia, and Genoa, (October.)

Propagation may be effected by seeds, and cross impregnation to get varieties; the seedlings will be productive when six years old; by layers, suckers, slips, and grafting, but by *cuttings* is the mode usually practised. These must be of young wood, about eight inches long, with two inches of old wood attached. Plant in October, in a sandy loam and warm situation, the surface covered with ashes, to exclude the frost and drought. "The tops of the cuttings will require the additional protection of haulm or litter during winter; give water and keep clear of weeds during summer, and by the following autumn the plants will be fit to be transplanted into nursery rows, where they must again be mulched at root, and protected at top. They require no pruning farther than to rear them with a single stem, and keep their heads of a regular shape; the second or third year they may be removed to where they are finally to remain. Cuttings of roots readily make plants, but the process is too slow for general use, and the plants so produced are not likely to come so soon into bearing as by the layers or cuttings."—*Loudon's Enc. Gard.*

Cuttings of the shoots may be of well-ripened wood, which Mr. Markham, of Hewell Gardens, says may be also "taken off in spring and potted singly in small pots; plunging them in

a warm cucumber-frame, and re-potting them two or three times, they will attain a large size in one summer. With these cuttings, as with the trees at all ages, bottom heat and water is every thing."—*Gard. Chron.*

Soil.—Mr. Markham says, "The best soil for this fruit is sandy maiden loam and turf mixed together, without manure of any kind, over-luxuriance being a great evil in their culture. I would advise all who are about to plant a fig wall, to form the borders about three feet deep, having a good drainage of any rough material. At the front of this, a wall four inches and a half thick, running parallel with the other should be brought up to within two inches of the surface, the intervening space being walled across so that each tree may have its own division. This prevents over-luxuriance, and causes them to fruit more freely. Any old trees that are growing strong and that do not bear well, might have their roots pruned back in autumn and walled in as above described. By doing this early it would afford the tree time to provide itself with new feeders, and by opening a trench in the front of the wall, about the end of March or beginning of April, and applying a pretty brisk lining of leaves and long litter for a few weeks, it would greatly assist the crop for that season, and establish the trees for the following. Water occasionally with soft water; and, after the fruit has attained three-fourths of its size, two or three good waterings of liquid manure will assist materially in bringing the fruit to a large size."—*Gard. Chron.*

Good drainage is also very important; an excess of root-moisture making the plants over-luxuriant.

Standards must have a single stem, and require no other pruning than to remove irregular growths, suckers, and decayed branches. The soil should be forked over annually, and kept constantly freed from weeds by the hoe.

Wall-trees and Espaliers.—Mr. Markham says that of these, "The requisite pruning is merely to thin the branches where they are too thick, and to admit plenty of light and air. The points of any branches that indicate too luxuriant a growth are pinched out. The tree will show how young bearing wood is procured, when the branches get too long, or begin to have a naked appear-

ance. For covering the fig in winter, a double thickness of old mats is advisable, with a little mulching; a wide coping on the wall is very essential, and a canvas covering drawn over them at night in the early part of their growth is of great benefit to them.”—*Gard. Chron.*

The Mode of Bearing is very peculiar, and influences the pruning, or rather non-pruning, which is to be preferred. The fig, observes Mr. Loudon, “bears, and in warmer climates brings to maturity in every year, two successive and distinct crops of fruit, each crop being produced on a distinct set of shoots. The shoots formed by the first or spring sap put forth figs at every eye as soon as the sap begins to flow again in July and August. These figs (which form the second crop of the year) ripen, in their native climate, during the course of the autumn; but rarely if ever come to perfection in England; where, though they cover the branches in great abundance at the end of that season, they perish and fall off with the first severe frosts of winter. The shoots formed by the second flow of sap, commonly called midsummer shoots, put forth figs in like manner at every eye, but not until the first flow of sap in the following spring. These last mentioned figs, which form the first crop of each year, ripen in warmer climates during the months of June and July, but not in this country before September or October.”—*Enc. Gard.*

Fig-House.—If a hot-house be devoted to this fruit, as it well deserves, good proportions, according to Mr. Markham, are “thirty-three feet long, fourteen feet wide, and eleven feet high at the back, trellised with wire two inches from the wall. The trees on this wall to be fan-trained; the roots walled in as recommended for the open wall, excepting that the spaces are to be narrower, being two feet wide and two and a half deep; the path leading through the house to rest on this partition wall. Between this path and the front, may be a border for small standards and circular-trained trees, ranging from three to five feet high, all walled in with rough stones, for the same purpose as already stated. The sorts may be the Nerii; Brown Ischia; large White Genoa; and Kennedy’s Fig, but the greater part the Nerii. Prune in

the latter part of February; but this is a very trifling operation where they have been properly attended to in summer, being only to cut out here and there a superfluous shoot, or to shorten one back to any naked or unfurnished part, in order to procure a supply of young shoots. Then have the whole forked over between the trees, giving them a good watering. Small fires are then to be lighted, keeping the temperature at 50°, and syringing morning and evening with tepid water. Air is to be given plentifully in fine weather, and when the fruit begins to grow, the temperature raised to 55°, then to 60°, and so on progressively about the same as for vines. For the first six or seven weeks water only in such quantities to keep the soil moderately moist, but afterwards more freely.

“When the fruit is about half grown, commence watering freely every morning, and generally about twice a week, with liquid manure. As soon as the young shoots have attained the length of four or five inches, their points are to be pinched out; this shoot is the ‘second crop wood’ for the latter part of summer or autumn, according as the forcing was commenced early or late. During the growth of the second crop of fruit, the tree produces a second shoot from three to six inches long, which, when properly ripened, contains the crop in the embryo state through the winter for the following spring. A short time before the first crop of fruit is ripe, the watering overhead is discontinued and abundance of air given. As soon as practicable, the watering overhead is to be resumed in every part of the house where the fruit is not approaching maturity. The succession of fruit generally lasts about four months.

“The winter management is merely to keep the borders moderately dry, and to prevent frost from entering.”—*Gard. Chron.*

Forcing in Pots.—“For this purpose,” says Mr. Markham, “the plants should be examined as early in the autumn or winter as possible, and those plants that have got their roots much matted together should have them reduced, and potted in sweet maiden loam, ready for the spring-forcing in January or February, as they may be wanted. The pots should be plunged in a half-spent tan or leaf bed, either in

a pit or forcing-house. If neither of these can be had, prepare a small bed of leaves and manure, and place a deep frame over it, plunging the plants to such a depth as to enable the roots to have 8° or 10° more heat than the tops. By doing this the roots are put in action first, which causes the embryo fruit to come forth in such a strong healthy manner as will ensure a good crop. After the fruit is fairly shown, the plants may then be removed to any forcing-house where they can have plenty of light and air. If they can be plunged in gentle heat, so much the better. It should always be borne in mind that the fig, in its growing state, is almost an aquatic, therefore little danger is to be apprehended from over-watering, but serious mischief may arise from not attending to this; for if ever the soil gets thoroughly dry when the fruit is far advanced, some evil will be sure to result."—*Gard. Chron.*

The Temperature borne by the fig advantageously is very high. Even when ranging from 90° to 110° during the day, and never lower at night than 70° , though some varieties grow too luxuriantly, yet the Large White ripened both its spring and autumn produce, and Mr. Knight thus obtained from the same plants eight crops in twelve months.

FILBERT. *Corylus avellana*.

Varieties.—*Frizzled*, great bearer. *Red* (*C. tubulosa*), pellicle of kernel pink, flavour excellent. *White*, pellicle white, flavour good. *Cosford*, great bearer, good; shell very thin. *Down-ton*, large, square. *Cob Nut*.

Propagation.—This is done by planting the nuts, by layers, suckers from the root; and by grafting and budding.

By the Nuts.—This should be done in October; but if postponed until spring, preserve the nuts in sand, and in February plant them in drills near two inches deep. The plants will appear in six or eight weeks, which, when a year old, plant out in nursery-rows, and there train them two or three years. In raising these trees from the nut, the sorts are not to be always depended on, for, like other seedling trees, they often vary, so that the most certain method to continue the respective sorts is by layers.

By Layers is one of the most certain methods of continuing the respective

varieties distinct; and this is a very easy and expeditious method of propagation; for every twig layed will readily grow: therefore, in autumn or winter, let some of the lower branches that are well furnished with young shoots be pegged down in the ground; then lay all the young shoots in the earth, with their tops out, every one of which will root, advance in length, and be fit to transplant by autumn following, when they should be separated, and planted in nursery rows, two feet asunder, and trained as observed of the seedlings; but when any considerable quantity are to be raised this way, it is eligible to form stools for that purpose, by previously, a year before, heading-down some trees near the ground, to throw out a quantity of shoots near the earth, convenient for laying for that use annually.

Suckers arising from the roots of trees raise by either of the above methods, if taken up in autumn, winter, or spring, with good fibres, will also grow, form proper plants, and produce the same sort of fruit as their parent plant; and suckers of these may also be used for the same purpose.

By grafting and budding.—These methods have also the same effect as layers of continuing any particular variety with certainty, and the operation is to be performed in the usual way on stocks of any of the varieties of this genus.—(*Abercrombie*.)

"The season for *planting* is autumn or spring; or any interval in mild weather from October till the beginning of March. Allot detached standards not less than ten and thence to twenty feet distance, to have room to branch out in full heads."—*Loudon, Enc. Gard.*

Soil.—"A hard loam of some depth, on a dry subsoil, which dress every year; as the filbert requires a considerable quantity of manure."—*Loudon, Enc. Gard.*

Pruning and Culture.—Mr. R. Scott says, "The plants should be trained with single stems to the height of a foot or so; then permitted to branch into a symmetrical head, rather open in the middle, and not of greater height than a man can conveniently reach from the ground, to perform the necessary operations of pruning and gathering.

"The proper time for pruning is in the spring, when the male blossoms are

open, as then the shaking of the trees, by the act of pruning, assists in the diffusion of the pollen. The young shoots should be shortened to about half their length; and it is best to cut to a bud that shows a female blossom. All suckers should be carefully removed. Formerly it was the practice to train the branches to nearly a horizontal position, which may still be seen in many old plantations; but experience has shown that the trees produce equally well, and as good nuts, by allowing them to take a more natural form. By way of manuring, some cultivators throw off the surface soil two or three feet wide round the stem of the tree, and into this basin the small prunings, leaves, &c., are put and dug in."—*Gard. Chron.*

Preserving.—"The easiest and best method is to gather them when quite dry, and stow them away in large garden pots, or other earthen vessels, sprinkling a little salt amongst them throughout the whole mass, which preserves the husks from getting mouldy and rotten; the pots should then be turned bottom upwards on boards, and buried in the ground, or kept air-tight by some other means. Stoneware jars, with lids, might be advantageously used for this purpose, and nuts of any kind will keep a long time in this way."—*Gard. Chron.*

Insects. See *Curculio* and *Aphis*.

FINOCHIO or AZOREAN FENNEL (*Anethum azoricum*), does not usually succeed in this country. Neither is it in much esteem here, being agreeable to few palates. It is served with a dressing like salads.

Soil and Situation.—For the first crop a rich light soil on a moderate hot-bed must be selected; for the succeeding sowings a more retentive one, but for the last two a return must be had to a drier and a warmer situation. A small bed will be required only at each sowing; one twenty feet by four is sufficient for the largest family.

Time and Mode of Sowing.—From the beginning of March until the close of July, at intervals of a month, for after attaining its full growth, it immediately advances for seed. The seed is sown in drills two feet asunder, to remain; scattered thinly, that is, about two inches apart, and about half an inch below the surface. The first sowings must be in a slight hot-bed, and under

a frame. The seedlings must be small-hoed, to kill the weeds, from which they should be kept completely clear throughout their growth; but at first only thin to three or four inches asunder, as it cannot thus early be determined which will be the most vigorous plants. After the lapse of another month they may be finally thinned to seven or eight inches distance from each other. Moderate waterings are required throughout their growth during dry weather; and in the meridian of hot days the beds are advantageously shaded, until after the plants are well up. When of advanced growth, about ten weeks after coming up, the stems must be earthed up to the height of five or six inches, to blanch for use, which will be effected in ten or fourteen days. In the whole about twelve or fourteen weeks elapse between the time of sowing and their being fit for use. In autumn, if frosty mornings occur, they should have the protection of some litter or other light covering.

To obtain Seed.—The seed coming from Italy is generally worthless, and in this country it is saved with difficulty, the plants of the last sowings, if left, being killed by the winter; and if some of the earliest are allowed to remain, they never ripen until late in the year, and are often killed by early severe frosts.

FIR. See *Pinus* and *Coniferæ*.

FISH. See *Animal Matters*.

FLACOURTIA. Eight species. Stove evergreen shrubs. Cuttings. Loam and peat.

FLAKE, is the term by which a carnation is distinguished that has two colours only, and these extending through the petals.

FLAX-STAR. *Phormium Linum-stellatum*.

FLORISTS' FLOWERS are those which, by their beauty or fragrance, power to produce permanent varieties, and facility of cultivation, are so largely in demand as to render them especially worthy of cultivation as an article of commerce.

Mr. Glenny has justly enumerated the necessary characteristics of a florist's flower to be—1st. The power to be perpetuated and increased by slips and other modes independent of its seed. 2dly, the power to produce new varieties from seed, capable, like their parent,

of being perpetuated; and 3dly, it must possess sufficient interest and variety to be grown in collections.

At present the chief florists' flowers are the *Amaryllis*, *Anagallis*, *Anemone*, *Auricula*, *Calceolaria*, *Carnation*, *Chrysanthemum*, *Cineraria*, *Crocus*, *Dahlia*, *Fritillary*, *Fuchsia*, *Gladiolus*, *Hyacinth*, *Hydrangea*, *Ixia*, *Iris*, *Lily*, *Lobelia*, *Narcissus*, *Pansy*, *Pæony*, *Pelargonium*, *Petunia*, *Phlox*, *Pink*, *Polyanthus*, *Ranunculus*, *Tulip*, *Tuberose*, *Verbena*. In the United States Florists' flowers are, as such, unknown. We have many amateurs, but not in sufficient number to create the emulation which exists in Great Britain, where thousands rival each other in the culture of flowers of their peculiar fancy—not for profit, but enjoyment and relaxation from the toil of the work-shop, or the mine.

FLOWER. See *Bloom*.

FLOWER FENCE. *Poinciana*.

FLOWERING ASH. *Ornus*.

FLOWER OF JOVE. *Lychnis flos Jovis*.

FLOWER GARDEN, is that portion of the ground in the vicinity of the residence, disposed in parterres and borders, tenanted by flowers and flowering shrubs, and among walks and lawns, so that the occupiers of the house may have ready access to what is so beautiful in form, colour, and fragrance. Under the title *Pleasure Ground*, the portions of ornamented garden more distant from the house are considered.

Aspect.—The flower garden should encompass every side of the house upon which a window opens that is frequented by the master or his friends, whether in parlour or bed-room. The aspect of the flower garden, therefore, must vary; but that which is best, because most favourable to flowers, is the south, south-eastern, and south-western sides of the residence; and it is usual to arrange it so that the kitchen garden is immediately beyond it. Variety of aspect secures a succession of flowering in the same kinds. No directions can be given as to the appropriate size, for, if the proprietor delights in flowers, there is no reason why his parterres should not be large, though his villa be small. A very common proportion for a small cottage is, the flower garden being one-fourth the size of the kitchen garden.

Soil.—Any fertile light soil is propitious, for this can be altered easily to

suit any flowers. The most intractable are clay and gravel. The first is forever sodden with wet, or baked hard; and the latter is hungry, and burnt up in summer.

Arrangement.—Mr. Loudon says,—“Shelter is equally requisite for the flower as for the kitchen garden, and where naturally wanting, is to be produced by the same means, viz., planting. The plantations, except on the north, or very exposed points, should not be of the tallest kinds of trees. A few elegant shrubs, and one or two trees, may be scattered through the scene, either in the dug compartments, or in the turf glade, for the purpose of shelter and shade as well as ornament; but in general, much of either of the two former qualities are highly injurious, both to the culture of flowers and the thick closeness of turf; sometimes an evergreen hedge will produce all the shelter requisite, as in small gardens composed of earth and gravel only; but where the scene is large and composed of dug compartments, placed on lawn, the whole may be surrounded by an irregular border of flowers, shrubbery, and trees.”—*Enc. Gard.*

All this is excellent, and I will only add these general additional rules:—always plant in masses, and with due attention to the harmony and contrast of colours and forms.

Fig. 45.



FLOWER GATHERER (Fig. 45), is a pair of scissors and pincers combined; they are of great advantage in gathering roses and other flowers which have thorny stems, as the flower cut by the scissors, is held fast by the part that acts as pincers.—*Rural Reg.*

FLOWER POTTS are of various sizes and names:—

	In. diam. at top.	In. deep.	Lindley
Thumb pots are, inside.	2½	2½	Thumbs. in.
Sixties (60s) to the cast	3	3½	3
Forty-eights (48s)	4½	5	5

Thirty-twos (32s)	6	... 6	... 6
Twenty-fours (24s)	8½	... 8	... 8
Sixteens (16s)	9½	... 9	... 9
Twelves (12s)	11½	... 10	... 11
Eights (8s)	12	... 11	... 12
Sixes (6s)	13	... 12	... 13
Fours (4s)	15	... 13	... 15
Twos (2s)	18	... 14	... 18

Dr. Lindley has proposed a very judicious change in the nomenclature of flower pots, by suggesting that they should be called according to their greatest diameter. At present the words "Fours," "Sixes," &c., intend no more than that there are so many to the cast, a piece of information conveying nothing worth knowing:—but by the new nomenclature, "Eighteens," will be pots of eighteen inches in diameter; "Fifteens," fifteen inches, and so on; it occupies the third column in the preceding table.

The above are *about* the sizes in inches, for at each pottery they rather differ in size, and none of the pots shrink exactly alike during the burning.

At some of the country potteries, also, the gradation and size are somewhat different. Thus, at Mr. Paul's Pottery, near Fareham, Hants, the sizes are the following:

	In. diam. at top.	In. deep.
Thimbles are, inside	2	2
Thumbs	2½	3
Seventy-twos	3	3½
Sixties	3½	4
Forty-eights	4½	5
Thirty-twos	5	6
Twenty-fours	6	7
Sixteens	7½	8
Twelves	8	9
Eights	10	11
Sixes	11½	12½
Fours	14	14
Twos	16	15

Thimbles are sometimes called "small nineties," and thumbs, "large nineties."

The Philadelphia potters have long pursued the plan proposed by Dr. Lindley, and those at distant points who may desire to order, have only to express the size in inches, i. e., the diameter at top.

The form and material also vary. Mr. Beck makes them very successfully of slate; and the prejudice against glazed pots is now exploded.

It was formerly considered important to have the pots made of a material as porous as possible; but a more miserable delusion never was handed down untested from one generation to another. Stoneware and chinaware are infinitely preferable, for they keep the roots more uniformly moist and warm. Common garden pots if not plunged, should be thickly painted. Mr. W. P. Ayres recommends large pots to be employed, and there is no doubt that this is a system much abridging the gardener's labour; but as with due care small pots will produce magnificent specimen plants, I cannot recommend an adoption of large pots, ensuring as they do such an immense sacrifice of room in the hot and green-houses. Captain Thurtell, the most successful of growers of the Pelargonium, never employs pots larger than twenty-fours.

It is usual to have *saucers* in which to place flower pots when in the house, and so far as preventing stains and the occurrence of dirt, they are deserving adoption; but as to their being used for applying water to plants, they are worse than useless. The great difficulty in pot-cultivation is to keep the drainage regular, and no more effective preventive of this could be devised than keeping a pot in a saucer containing water. No plan could be invented more contrary to nature; for we all know that she supplies moisture to the surface of the soil, and allows it to descend, thus supplying the *upper* roots first. To facilitate draining, and yet to retain the tidiness secured by the saucer, Mr. Hunt has had flowerpots made with elevations, on which the pots are placed. (Fig. 46.) But this is not the only advantage derivable from them. They prevent the entry of worms, may be employed with common stands, allow a current of air to pass beneath them, and their form is elegant.

Fig. 46.



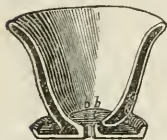
Mr. Brown (Fig. 47) has proposed a pot with hollow sides, the vacancy to be filled with water through a hole in the rim, or left empty, as occasion requires. The water, he considers, will

prevent the plants suffering from want of moisture; and when empty, the roots will be preserved from being killed by evaporation. But surely applying the water to the sides will be an extra inducement for the roots to gather there, an effect most desirable to avoid, and wetting the outsides of the pot is a very doubtful mode of preventing the reduction of temperature.

Fig. 47.



Fig. 48.



Saul's Fountain Flower Pot (Fig. 48), seems open to the same objections, with the additional disadvantages of not being easily drained, and being more expensive and cumbersome. The water also is forced in at the bottom of the pot, contrary to the course of nature in applying moisture to plants. "An outer basin is made on the bottom of the pot, to which the water enters at *a*, and is carried round the pot in the basin, there being two or three holes through the pot's bottom *bbb*. By these means the water is drawn up from the basin by the roots of the plants (!) or, if it should be desirable to prevent it from being drawn up, the exterior orifices of the holes, which open into the basin or saucer, may be closed (!) The fountain is supplied with water by taking out the stopper *c*, the entrance into the basin at *a*, being at that moment closed; and as soon as the water runs over at *c*, the cork or stopper is put in, and the fountain at *a* removed."—*Gard. Mag.* March, 1843, 136.

Mr. Stephens' Flower Pot (Fig. 49)

Fig. 49.



rims.—*Ibid.*

Mr. Rendle, the intelligent proprie-

tor of the Plymouth Nursery, proposed to improve the drainage of pots, by elevating and piercing their bottoms. This, and Mr. Brown's, suggested to me that of which Fig. 50 is a section.

Fig. 50.



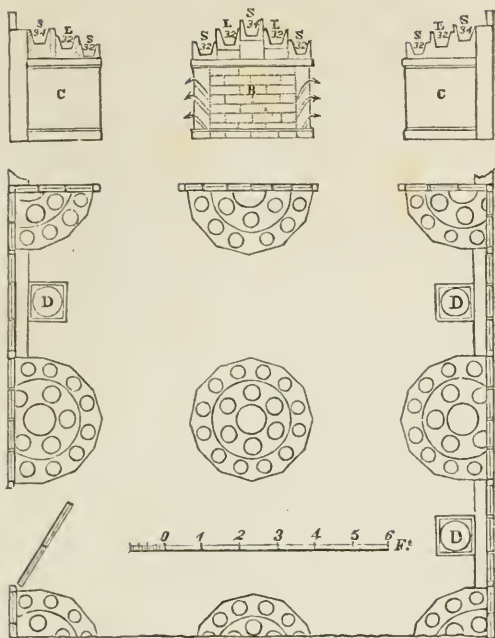
It is merely two pots, one fitting within another, having its bottom indented and pierced as proposed by Mr. Rendle, but not touching the outer pot by half an inch all round. This is a most effectual form to secure drainage, and to prevent the evaporation from the sides of the inner pot, the intervening stratum of confined air being a bad conductor of heat. It has the merit too of cheapness.—*Johnson's Gardener's Almanack.*

FLOWER STAGES are made for the exhibition of flowers at shows, in the green-house, and elsewhere. The following are some very judicious observations on the subject:—"The first object in the construction of stages should be to have them so constructed and situated as to afford facilities for grouping plants; the second should be to give plants more the appearance of growing in borders, than upon artificial structures; and the third to keep the pot out of sight. This is requisite for two reasons; first, because they are no ornament, and secondly, that it is always desirable to protect the plant from being scorched by exposure to the sun. It is also desirable to adopt another mode of construction, for the purpose of giving plants that aspect which is most suited to their habits; and therefore, instead of placing the stages from the front to the back of the house, as is generally the case, I would place them in groups of stages, thus producing an effect similar to the borders in a well-arranged flower garden.

"The spectators in their progress from group to group would be attracted by the separate display in each, instead of having their attention drawn away by a whole blaze of beauty at once.

"The accompanying drawings (Fig. 51) represent the manner in which I propose that such stages as have been described should be constructed and placed in any floricultural building. The ground plan represents part of the floor

Fig. 51.



of a house, nineteen feet by thirteen, on which are placed twelve stages, and three vases, (D D D) basins, or any other suitable ornamental article, with a gangway betwixt them three feet wide.

“The plan also shows sections of three different modes of constructing the stages, and the position of the pots in each; all the stages stand upon stone tables, resting upon brick piers, the top of each table being two feet two inches above the level of the floor.

“In the stage (A) there are no shelves, the pots being plunged into cylinders (made of the same material as flower pots) standing upon the tables, as shown by the dotted lines; the space all round them being filled with compost level with the rim of each series of pots. The object of this plan is to afford opportunities of planting various creepers round each of the potted plants, for which there will be plenty of room when they stand twelve inches apart from stem to stem. The pots are sup-

posed to rest by their rims upon the edge of the cylinder, and may of course be removed with the greatest facility.

“In the centre stage (B), the supporters stand directly upon the table, and are connected to it, the space between each being made water-tight, and filled up solid to within half an inch of the bottom of the pot. If an inch deep of water is poured in this space, the pot will be immersed half an inch; a small hole in the side will regulate the height of the water line, and another in the bottom will draw off the water when it requires changing. This mode of construction may be adopted for such plants as need large supplies of water.

“The stage (C) is supposed to have shelves pierced with holes to receive the pots, which rest upon their rims. The stages in my little green-house are so fitted up, and have been by many practical men, who prefer this plan of plunging the pots into the stages to the

old one of setting them upon the shelves. The fronts of the stone tables may be variously ornamented, those in one house having trellised panels, another having rusticated courses of brick or stone, while a third may be in imitation of rustic basket-work, and a fourth in rough courses like small rockeries, with spaces between for creepers, orchidaceous, or any other plants best suited to the purpose.

“The dotted lines under the stage (B) will give some idea how this may be done; various other modes of ornamenting may be adopted according to the particular taste of the individual. The vases, &c. (DDD) may be filled with climbers for the open space against the sides of the house, and with creepers to hang over the edges. The flower pots intended to be used in such stages as have been described, should be gauged before the plants are put into them, and all those rejected which do not fit the holes; the waste ones will answer for propagating, &c.”—*Gard. Chron.*

Mr. Ainger, also, makes these good suggestions:—“Stages are frequently formed of an equal or nearly equal series of ascents, in consequence of which the upper plants are by no means so well seen as the lower ones. The proper plan is to commence by small elevations, gradually increasing as the shelves recede from the eye. The lowest shelf to be eighteen inches from the floor, the first rise is six inches, the next nine, twelve, fifteen, eighteen, twenty-one, and so on. The upper shelves should also be broader than the lower for larger pots. The advantage of this arrangement as commanding a better view of the flowers is too obvious to need pointing out.”—*Gard. Chron.*

FLUES are pipes formed of brick or slate, for conducting heated air through stoves or other buildings where a high artificial temperature is desired. It is a mode of heating nearly banished by the much more manageable and effectual modes of heating by hot water; and flues have the additional disadvantages, that they require frequent sweeping, and that they emit a sulphurous fume that is injurious to plants and disagreeable to the frequenters of the structures so heated. This has been obviated by using Valencia slates in the place of bricks, yet flues under no circumstances

can compare with either the pipe or tank system of hot water heating. When flues are employed they are constructed inside and near the walls of the building; each flue eight or nine inches wide in the clear, by two or three bricks on edge deep, ranged horizontally one over the other the whole length of the back wall, in three or four returns communicating with each other, continued also along the end and front walls in one or two ranges, to be used occasionally; furnished with a regulator to slide open and shut as required, the whole proceeding from the first lowermost flue, which communicates immediately from the furnace or fire-place behind either the back wall at one end, or in the back part of the end walls; or if very long stoves, of more than forty feet length, two fire-places are requisite, one at each end; each having its set of flues ranging halfway; each set of flues terminating in an upright chimney at the end of the back outside.—*Hood on Warming, &c.*

Morris, Tasker and Morris of the Pascal Works near Philadelphia, have paid considerable attention to the construction of heating apparatus, whether for air or water. Those who desire such structures for green-houses, conservatories, &c., may safely rely on their experience and probity.

FLY. See *Black Fly*.

FLY-WORT. *Myanthus*.

FŒTIDA *mauritiana*. Stove evergreen tree. Cuttings. Turfy loam and peat.

FONTANESIA *phillyræoides*. Half-hardy deciduous shrub. Layers and cuttings. Common soil.

FORCING is compelling culinary vegetables to be edible, flowers to bloom, and fruits to ripen, at unnatural seasons, being the very contrary of the object for which our green-houses and hot-houses are constructed; viz., to secure a temperature in which their tenants will be in perfection at their natural seasons. Under the heads of *Hot-beds* and of each particular plant will be found directions for forcing, and it will be sufficient here to coincide with Dr. Lindley in saying, that as forced flowers are always less beautiful and less fragrant; and forced vegetables and fruits less palatable and less nutritious than those perfected at their natural periods—it is desirable, at the very least, to devote as much effort and expense to obtain superior produce

at accustomed times, as to the procuring it unseasonably. Rarity is good, but excellence is best.

FORE-RIGHT SHOOTS are the shoots which are emitted directly in front of branches trained against a wall, and consequently cannot be trained in without an acute bending, which is always in some degree injurious.

FORK. This instrument is preferable to the spade, even for digging over open compartments, for the soil can be reversed with it as easily as with the spade; the labour is diminished, and the pulverization of the soil is more effectual. (See *Digging*.) For stirring the soil in plantations, shrubberies, and fruit borders, a two-pronged fork is often employed, but that with three prongs is quite as unobjectionable, and a multiplicity of tools is an expensive folly. Dr. Yelloly's fork is certainly a good working implement. Its entire length, three feet three and a half inches; handle's length, two feet two inches; its diameter one and a half inch; width of the entire prongs seven inches at the top; width at the points six inches; prongs thirteen and a half inches long, and at the top seven-eighths of an inch square, tapering to a point. The straps fixing the head to the handle are eleven inches long, two inches wide, and half an inch thick, feathering off; weight of fork, eight pounds.

Leaf-fork. Mr. Toward, of Bagshot Park, describes a very serviceable implement of this kind; he says—"One person with this implement will take up with greater facility more leaves than two persons could do with any other tool. It is simply a large four-tined fork, made of wood, shod with iron; the tines are eighteen inches long, and are morticed into a head about seventeen inches long, and one and a half inch by two and a quarter inches thick. The tines are one inch in width, and one and a half inch in depth at the head, gradually tapering to a point with a curve or bend upwards. The wood of which they are formed ought to be hard and tough; either oak or ash will do, but the *Robinia Psuedo-Acacia* is preferable to either. The head should be made of ash, with a handle of the same, and should be two feet four inches long. Its recommendations are its size and lightness, the leaves also do not hang upon it as on a common fork, the large size

of the tines tearing them asunder."—*Gard. Chron.*

FÓRMICA. See *Ant.*

FOTHERGILLA. Four species. Hardy deciduous shrubs. Layers and seed. Peat.

This genus derives its name from John Fothergill, an eminent physician, born in Yorkshire in 1712. In 1762 he purchased an estate at Upton, and there founded an excellent botanic garden.

FOUNTAINS surprise by their novelty, and the surprise is proportioned to the height to which they throw the water; but these perpendicular columns of water have no pretence to beauty. The Emperor fountain at Chatsworth is the most surprising in the world, for it tosses its waters to a height of two hundred and sixty-seven feet, impelled by a fall from a reservoir three hundred and eighty-one feet above the ajutage, or mouth of the pipe from which it rushes into the air.

For an interesting description of this fountain and the grounds at Chatsworth, the seat of the Duke of Devonshire, see Downing's "*Horticulturist*."

The following are a few of the most powerful fountains in Europe:—

	Feet.
The Emperor at Chatsworth, } height of jet	267
Wilhelmshöhe Fountain in } Hesse Cassel	190
Fountain, St. Cloud	160
Peterhoff, Russia	120
The old Chatsworth	94
Versailles	90

Mr. Paxton has stated that, "Whatever be the direction of the jet, the discharge of water is always the same, provided that the altitude of the reservoir be the same. This is a necessary consequence of the equal pressure of fluids, in all directions. Water spouting from small ajutage has sufficient velocity to carry it to the same height as the water in the reservoir; but it never attains entirely this height, being prevented by various concurring causes. 1st. Friction in the tubes. 2d. Friction against the circumference of the aperture. 3d. The resistance of the air, its weight obstructing the rising column."—*Gard. Chron.*

Mr. Loudon justly observes, that it is not easy to lay down data on this head; if the bore of the ajutage be too small, the rising stream will want suffi-

cient weight and power to divide the air, and so being dashed against it, will fall down in vapour or mist. If too large it will not rise at all. The length of pipe between the reservoir and the jet will also impede its rising in a slight degree, by the friction of the water on the pipe. This is estimated at one foot for every hundred yards from the reservoir. The proportion which this author gives to the ajutages, relatively to the conducting-pipes, is one-fourth; and thus for a jet of four lines, a conducting-pipe of an inch and a half diameter; for a jet of six or seven lines, a conducting-pipe of two inches, and so on. From these data, the height of the fountain and the diameter of the conducting-pipe being given, the height to which a jet can be forced can be estimated with tolerable accuracy, and the contrary. But where the pipes are already laid, and the power of the head, owing to intervening obstructions, is not very accurately known, the method by trial and correction by means of a leaden nozzle, the orifice of which may be readily increased or diminished, will lead to the exact power under all the circumstances.

Ajutages.—"Some are contrived so as to throw up the water in the form of sheaves, fans, showers, to support balls, &c. Others to throw it out horizontally, or in curved lines, according to the taste of the designer; but the most usual form is a simple opening to throw the spout or jet upright. The grandest jet of any is a perpendicular column issuing from a rocky base, on which the water falling produces a double effect both of sound and visual display. A jet rising from a naked tube in the middle of a basin or canal, and the waters falling on its smooth surface, is unnatural without being artificially grand."
—*Gard. Enc.*

Draping fountains, or such as bubbling from their source trickle over the edge of rocks, shells, or vases, combining the cascade with the fountain, are capable of much greater beauty.

FOXGLOVE. *Digitalis*.

FRACTURES. If an immaterial branch is broken, it is best to remove it entirely, but it sometimes happens that a stem or branch which cannot be replaced, is thus injured, in which case it is advisable to attempt a reduction of the fracture; and if it be only partial,

and the stem or branch but small, the parts will again unite by being put back into their natural position, and well propped up. Especially the cure may be expected not to succeed if the fracture is accompanied with contusion, or if the stem or branch is large. And even where it succeeds, the woody fibres do not contribute to the union; but the granular and herbaceous substance only which exudes from between the wood and liber, insinuating itself into all interstices, and finally becoming indurated in the wood.—*Keith*.

Splints extending at least a foot above and below the fracture, should be bound very firmly all round, and a plaster of grafting-clay to exclude wet be placed over all; and every precaution adopted to prevent the surfaces of the wound being moved by the force of the wind.

F R A G A R I A. Fourteen species. Hardy herbaceous. Seeds and runners. Common soil. See *Strawberry*.

FRAMES are structures employed either in forcing, or in protecting plants, and are of various sizes.

According to the good practical rules of Abercrombie:—"The one-light frame may be about four feet and a half in width from back to front, and three feet six inches the other way; fifteen or eighteen inches high in the back, and nine in front, with a glass sash or light made to fit the top completely, to slide up and down, and move away occasionally.

"The two-light frame may be seven feet long, four and a half wide, and fifteen or eighteen inches high in the back, with bars reaching from it at top to the front, serving both to strengthen the frame and help to support the lights; the two lights to be each three feet six inches wide, made to fit the top of the frame exactly.

"The three-light frames should be ten feet six inches long, four and a half wide, and from eighteen inches to two feet high in the back, and from nine to twelve or fifteen inches in front—observing that those designed principally for the culture of melons, may be rather deeper than for cucumbers, because they generally require a greater depth of mould or earth on the beds; though frames, eighteen or twenty inches in the back, and from nine to twelve in front, are often made to serve occasion-

ally, both for cucumbers and melons; each frame to have two cross bars, ranging from the top of the back to that of the front, at three feet six inches distance, to strengthen the frame, and support the lights; and the three lights to be each three feet six inches wide; the whole together being made to fit the top of the frame exactly, every way in length and width.

“ Sometimes the above sort of frames are made of larger dimensions than before specified; but in respect to this it should be observed that if larger they are very inconvenient to move to different parts where they may be occasionally wanted, and require more heat to warm the internal air; and in respect to depth particularly, that if they are but just deep enough to contain a due depth of mould, and for the plants to have moderate room to grow, they will be better than if deeper, as the plants will be then always near the glasses—which is an essential consideration in early work—and the internal air will be more effectually supported in a due temperature of warmth. For the deeper the frame, the heat of the internal air will be less in proportion, and the plants being far from the glasses will be some disadvantage in their early growth. Besides, a too deep frame, both in early and late work, is apt to draw the plants up weak; for they always naturally aspire towards the glasses, and the more space there is, the more they will run up; for which reason the London kitchen-gardeners have many of their frames not more than fourteen or fifteen inches high behind and seven in front, especially those which are intended to winter the more tender young plants, such as cauliflower and lettuce, and for raising early small salad, herbs, radishes, &c.

“ The wood work of the back, ends, and front should be of inch or inch and a quarter deal, as before observed, which should be all neatly planed even and smooth on both sides; and the joints, in framing them together, should be so close that no wet nor air can enter. The cross-bars or bearers at top, for the support of the glasses, should be about three inches broad and one thick, and neatly dove-tailed in at back and front even with both edges, that the lights may shut down close, each having a groove or channel along the

middle to conduct off all wet falling between the lights. At the end of each frame, at top, should be a thin slip of board, four inches broad, up to the outside of the lights, being necessary to guard against cutting winds rushing in at that part immediately upon the plants, when the lights are occasionally tilted behind for the necessary admission of fresh air, &c.

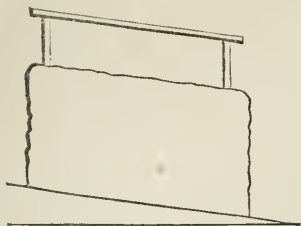
“ With respect to the lights, the wood-work of the frame should be inch and a half thick and two and a half broad; and the bars, for the immediate support of the glass-work, should be about an inch broad, and not more than inch and a half thick: for if too broad and thick, they would intercept the rays of the sun, so should be only just sufficient to support the lights and be ranged from the back part to the front, eight or nine inches asunder.

“ All the wood-work, both of the frames and lights, should be painted to preserve them from decay. A lead colour will be the most eligible; and if done three times over, outside and in, will preserve the wood exceedingly from the injuries of weather, and from the moisture of the earth and dung.”

Mr. Knight has suggested an important improvement in the form of frames. He observes, that the general practice is to make the surface of the bed perfectly horizontal, and to give an inclination to the glass. That side of the frame which is to stand towards the north is made nearly as deep again as its opposite; so that if the mould is placed of an equal depth (as it ought to be) over the whole bed, the plants are too far from the glass at one end of the frame and too near at the other. To remove this inconvenience, he points out the mode of forming the bed on an inclined plane; and the frame formed with sides of equal depth, and so put together as to continue perpendicular when on the bed, as represented in the accompanying sketch, Fig. 52.

There are several minor points in the construction of frames that deserve attention. The strips of lead or wood that sustain the panes of glass should run across the frame, and not lengthwise; they then neither obstruct so much the entrance of light nor the passing off of rain. The inside of the frame should be painted white, since plants

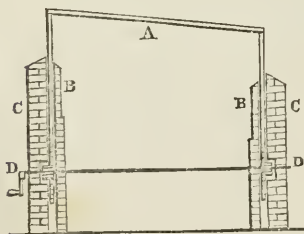
Fig. 52.



generally suffer in them for want of light: if the accumulation of heat was required, the colour should be black.

Raising the Frames.—It is a well-known difficulty that the gardener has, in raising the frames so as to keep the foliage of the plants within them at a determined and constant distance from the glass. To remedy this, Mr. Nairn, gardener to J. Creswell, Esq., of Battersea Priory, has introduced the ingenious contrivance represented in the accompanying sketch and references:—A, a movable frame; B B, inside lining of the pit; C C, outer wall. Between these the sides of the frame pass, and are lowered or elevated by racks and spindles, D D. Fig. 53.

Fig. 53.



A more simple plan might perhaps be adopted, by having frames of the same length and breadth as the original, but only from an inch to three inches, or upwards, deep. These, as necessary, might be put on the top, and would be kept close by the pressure of the lights; bolts and nuts might also be easily applied, and the interstices rendered still more impervious to air by being faced with list.

The frame may often be made a

substitute for the green-house; and on this subject we have the following statement of Mr. Crambe, of Redbraes, near Edinburgh:—

“Being deficient in accommodation for heaths and pelargoniums, Mr. Crambe procured two melon-frames, the dimensions of which were twenty feet long by eight wide; he then built walls of a few courses of bricks, inclosing an area of the exact size of the frames upon which they were placed. The floor was elevated six inches above the ground, level and paved with bricks laid in finely-sifted coal-ashes, having the crevices between them filled with sand, which makes a better jointing than lime, the close joints of which leave no escape for the surplus water,—placing the building in a longitudinal direction from east to west. As a fire-flue would have occupied more space than could be spared, Mr. Rogers’ conical boiler was adopted. The boiler is placed on the outside and is inclosed in a case of double sheet-iron, with a movable cover, and funnel of the same material, for the conveyance of smoke into a brick-chimney, the space between the case and boiler being filled with sand as an excellent non-conductor. At right angles to the end of the pit is a brick-wall about three feet high, inclosing the boiler on two sides, leaving an open space in front for the admission of air and the clearing away of ashes. A movable wooden cover, of a triangular form, is placed above, to protect the whole from the effects of the weather.

“The size of the boiler is eighteen inches high by twelve in diameter at the base, and is placed upon a cast-iron grating, having a furnace-door beneath for the regulation of air. The pipes, two inches and a half wide, are conducted along the front and secured to the wall with iron hooks, it being unnecessary to convey them round the back, as the apparatus is found sufficient to heat a space of double the size.

“For fuel he has uniformly found coke to maintain a constant and regular heat: indeed this sort of boiler is not suited for the consumption of coal, although, by a little alteration of the present form, it might be made to consume it as freely as coke. When the external temperature was as low as 20°, the internal heat of the pit did not

vary above 3° in fourteen hours, during which time it required no attention, and the cost of the fuel did not exceed twopence in twenty-four hours. When slight storms occurred, a covering of Russia-mats was substituted in lieu of fire-heat, which is always, to a certain degree, injurious to greenhouse plants, but more particularly so to heaths, a class of plants which, when cultivated in properly constructed pits, have a decidedly more healthy appearance than those grown in greenhouses."—*Gard. Chron.*

Shelter for the Glass.—In proportion to the number of lights, matting for shading and sheltering must be at hand. The usual mode of covering at night is by laying on mats, and over these litter, in thickness according to the severity of the season. Some gardeners lay hay immediately in contact with the glass, and over this the mats. Every person conversant with these modes of shelter is aware of their inconvenience. In rainy weather they soon become wet, and rapidly chill the beds; added to which, the trouble caused in placing and removing them, and the danger to the glass from the stones laid on as a resistance to the wind, are by no means inconsiderable.

Mr. Seton, to obviate these inconveniences, employs a particular covering, which he constructs of four laths, two of such a length as to exceed a little that of the frame, and the others in a similar manner that of its breadth. These are bound together at right angles, so as to form a parallelogram of the form and size of the frame; and pieces are bound across this at a foot apart from each other. Over this a mat is spread, and over the mat a layer of straw is fastened, laid on level like thatch, from three to six inches thick, as may appear necessary. If the breadth of the frame is, or exceeds, four feet, it is best to have the covering in two parts, otherwise it becomes weak and unwieldy. These panels, as they may be called, Mr. Seton also employs in preserving tender plants through the winter. A pit of frames, earthed up all round, and covered with one of them, or two or three if needful, is completely impervious to frost.

Substitutes for glass.—Oiled paper was formerly employed; but this has been superseded by linen dressed with

Whitney's or Tanner's compositions; or the gardener may employ the following preparation:—

"Old pale linseed oil, three pints; sugar of lead (acetate of lead), one ounce; white resin, four ounces. Grind the acetate with a little of the oil, then add the rest and the resin. Incorporate thoroughly in a large iron pot over a gentle fire; and, with a large brush, apply hot to a fine calico stretched loosely previously, by means of tacks, upon the frame. On the following day it is fit for use, and may be either done over a second time, or tacked on tightly to remain."—*Gard. Chron.*

The quantity made according to this recipe will be sufficient for about 100 square feet of calico.—*Johnson's Gard. Almanack.*

FRANCISCEA uniflora. Stove evergreen shrub. Cuttings. Peat and loam.

FRANCOA. Three species. Hardy herbaceous. Seed. Common light soil.

FRANKENIA. Nine species. Chiefly hardy evergreen trailers. Cuttings. Loam and sandy peat.

FRANKINCENSE. *Pinus tæda.*

FRAXINUS. The ash-tree. Forty-one species. Hardy deciduous trees. Seed, or budding or grafting on the common ash (*F. excelsior*).

FREE-STONE peaches and nectarines, the flesh of which parts readily from the stone.

FRENCH BEAN. See *Kidney Bean.*

FRENCH MARIGOLD. *Tugetes patula.*

FRIESIA peduncularis. Green-house evergreen shrub. Cuttings. Turfy loam and peat.

FRINGE TREE. *Chionanthus.*

FRITILLARIA. *Fritillary.* Twenty-three species, besides varieties. Hardy bulbs. Offsets. Sandy soil.

"The season for planting or transplanting all these bulbs is when their flower-stalks are decayed, in July or beginning of August, though the bulbs taken up at that time may be kept, if necessary, by being laid in dry sand; but the fritillary (*F. pyrenaica*) and Persian lily (*F. Persica*) are rather more impatient, out of the earth, than the crown imperial (*F. imperialis*), and therefore should always be put in again as soon as possible.

Propagation of all the species.—The general mode of propagation of all these plants is by offsets, which may be

separated every second or third year. The proper time is when their flower-stalks decay, taking the whole cluster of roots out of the earth and separating them into distinct roots, planting the smaller offsets by themselves, in nursery-beds, to remain a year or two; and the larger roots plant where they are designed to remain.

They are also propagated by seed to gain new varieties. The process is tedious. The fritillary and Persian lily will be three years, and the crown imperial sometimes six or seven, before they flower in perfection.

The seeds are to be sown in boxes of light earth in August or September, covering them with earth a quarter of an inch deep.—*Abercrombie*.

FROST. If a plant be frozen, and though some defy the attacks of frost, others are very liable to its fatal influence, death is brought upon them as it is in the animal frame, by a complete breaking down of their tissue; their vessels are ruptured, and putrefaction supervenes with unusual rapidity.

The following contingencies render a plant especially liable to be frozen.

“First. Moisture renders a plant susceptible of cold. Every gardener knows this. If the air of his greenhouse be dry, the plants within may be submitted to a temperature of 32° without injury, provided the return to a higher temperature be gradual.

“Secondly. Gradual decrements of temperature are scarcely felt. A myrtle may be forced and subsequently passed to the conservatory, to the cold-pit, and even thence to an open border, if in the south of England, without enduring any injury from the cold of winter; but it would be killed if passed at once from the hot-house to the border.

“Thirdly. The more saline are the juices of a plant, the less liable are they to congelation by frost. Salt preserves vegetables from injury by sudden transitions in the temperature of the atmosphere. That salted soil freezes with more reluctance than before the salt is applied, is well known, and that crops of turnips, cabbages, cauliflowers, &c., are similarly preserved is equally well established.

“Fourthly. Absence of motion enables plants to endure a lower degree of temperature. Water may be cooled

down to below 32° without freezing, but it solidifies the moment it is agitated.”—*Principles of Gardening*.

The seeds of some plants are benefited by being frozen, for those of the rose and the hawthorn never germinate so freely as after being subjected to the winter frosts.

Freezing is beneficial to soils, not only by destroying vermin within its bosom, but by aiding the atmosphere to pervade its texture, which texture is also rendered much more friable by the frost. M. Schluber says that freezing reduces the consistency of soils most remarkably, and that in the case of clays and other adhesive soils, the diminution of their consistency amounts to at least 50 per cent. In hoeing clay he found it reduced from sixty-nine to forty-five of the scale already stated, and in the ordinary arable soil from thirty-three to twenty. He satisfactorily explains this phenomenon by observing that the crystals of ice pervading the entire substance of the frozen soil, necessarily separate the particles of earth, rendering their points of contact fewer.

As soil in our climate is rarely frozen to a depth of more than four inches, and in extremely hard winters it does not penetrate more than six inches in light soils, and ten inches in those that contain more clay, or an excess of moisture, these facts, and the frequent failure of our potato crops, have led Dr. Lindley to the very judicious suggestion of planting these crops in autumn, which must be the best time if practicable, for it is pursuing the dictate of nature. That it is practicable, I have no doubt, for no frost would injure the sets, if a little coal ashes were put over them in each hole, for coal ashes are an excellent non-conductor of heat, and consequently opposed to a low reduction of temperature. Even if potatoes buried some inches beneath the soil's surface are frozen, they thaw so very gradually, that no injury to them occurs, unless the freezing has been sufficient to burst their vessels, which occurs very rarely.

FROTH-FLY. See *Tettigonia*.

FRUIT ROOM. “Fruit for storing should be gathered before it is quite mature, for the ripening process, the formation of sugar, with its attendant exhalation of carbonic acid and water, goes on as well in the fruit room as in

the open air at the season when the functions of the leaves have ceased, and the fruit no longer enlarges. In gathering fruit, every care should be adopted to avoid bruising; and, to this end, in the case of apples, pears, quinces, and medlars, let the gathering basket be lined throughout with sack-ing, and let the contents of each basket be carried at once to a floor covered with sand, and taken out one by one, not poured out, as is too usual, into a basket, and then again from this into a heap, for this systematic mode of inflicting small bruises is sure to usher in decay, inasmuch as that it bursts the divisional membranes of the cells containing the juice, and this being extravasated, speedily passes from the stage of spirituous fermentation to that of putrefaction. To avoid this is the principal object of fruit storing, whilst at the same time it is necessary that the fruit shall be kept firm and juicy. Now it so happens, that the means required to secure the one also effects the other.

“To preserve the juiciness of the fruit, nothing more is required than a low temperature, and the exclusion of the atmospheric air. The best practical mode of doing this is to pack the fruit in boxes of perfectly dried pit-sand, employing boxes or bins, and taking care that no two apples or pears touch. The sand should be thoroughly dried by fire-heat, and over the uppermost layer of fruit the sand should form a covering nine inches deep.

“Putrefaction requires indispensably three contingencies—moisture, warmth, and the presence of atmospheric air, or at least of its oxygen. Now burying in sand excludes all these as much as can be practically effected; and it excludes, moreover, the light, which is one of the prime agents in the ripening of fruit. The more minutely divided into small portions animal or vegetable juices may be, so much longer are they preserved from putridity: hence one of the reasons why bruised fruit decays more quickly than sound; the membranes of the pulp dividing it into little cells, are ruptured and a larger quantity of the juices are together; but this is only one reason, for bruising allows the air to penetrate, and it deranges that inexplicable vital power, which whilst uninjured acts so antiseptically in all fruits, seed, and eggs. Bruises the most

slight, therefore, are to be avoided; and instead of putting fruit in heaps to sweat, as it is ignorantly termed, but in fact to heat and promote decay, fruit should be placed one by one upon a floor covered with dry sand, and the day following, if the air be dry, be wiped and stored away as before directed. Fruit for storing should not only be gathered during the middle hours of a dry day, but after the occurrence of several such.

“Although the fruit is stored in sand, it is not best for it to be kept there up to the very time of using, for the presence of light and air is necessary for the elaboration of saccharine matter. A fortnight's consumption of each sort should be kept upon beach, birch, or elm shelves, with a ledge all round, to keep on them about half an inch in depth of dry sand; on this the fruit rests softly, and the vacancy caused by every day's consumption should be replaced from the boxes as it occurs. If deal is employed for the shelving, it is apt to impart a flavour of turpentine to the fruit. The store-room should have a northern aspect, be on a second floor, and have at least two windows, to promote ventilation in dry days. A stove in the room, or hot-water pipe with a regulating cock, is almost essential, for heat will be required occasionally in very cold and in damp weather; the windows should have stout inside shutters. Sand operates as a preservative, not only by excluding air and moisture, but by keeping the fruit cool; for it is one of the worst conductors of heat, and moreover it keeps carbonic acid in contact with the fruit. All fruit in ripening emits carbonic acid, and this gas is one of the most powerful preventives of decay known.

“The temperature of the fruit room should never rise above 40°, nor sink below 34° of Fahrenheit's thermometer, the more regular the better. Powdered charcoal is even a better preservative for packing fruit than sand; and one box not to be opened until April, ought to be packed with this most powerful antiseptic. If it were not from its soiling nature, and the trouble consequent upon its employment, I should advocate its exclusive use; I have kept apples perfectly sound in it until June.

“It is not unworthy of observation, that the eye or extremity farthest from

the stalk, is the first to ripen. This is most perceptible in pears, especially in the chaumontelle. That end therefore should be slightly imbedded in the sand; and thus excluding it from the light, checks its progress in ripening.”

—*Principles of Gardening.*

FUCHSIA. Twenty species, besides many varieties. Green-house evergreen shrubs. Seed and cuttings. Light rich loam and peat.

Varieties for open borders.—*F. Riccartonia*; *globosa*; *gracilis*; *Thomsonii*; *Clintonia*; *conica*; *reflexa*; *erecta*; and *virgata*.

For Pot-culture.—*Brockmannii*; *Exoniensis*; *Colossus*; *Attractor*; *Enchantress*; *Eppsii*; *Stanwelliana*; *Splendida*; *Defiance*; *Laneii*; *Toddiana*; *Champion*; *Victory*; *Majestica*; *Paragon*; *Splendens*; *Fulgens*; *Robusta*; *Youellii*; *Chandlerii*; *Venus Victrix*; *Money-pennii*; *Standishii*; *Dalstonii*; *Curtisii*; *Eclipse*; *Rosa Alba*; and *Spectabilis*. There are about eighty other named varieties of differing degrees of merit.

Soil.—The best is formed of equal parts rotted turf, sandy loam, and peat.

Propagation by seed.—Sow directly it is ripe. Bruise the berries, wash away their pulp, mix the seed with sand, sow thinly in pans of the soil just described, and place in the green-house. Prick into thimbles when the seedlings are large enough for handling; place under a hand-glass, in a stove or hot-bed, for a few days, and then remove into a green-house. Shift into larger pots as the roots fill those in which they are growing.

By cuttings.—No plant is more easily propagated by cuttings at any season of the year than the *Fuchsia*, but the best season is from the end of May to the end of July. Have the cuttings about three inches long; strip the leaves off the lower half of their lengths, and plant in pots, having the surface of the compost in them to the depth of an inch covered with sand. Plant in this the cuttings, so that their ends just touch the compost. Moisten the sand, place the pots in a green-house under the cover of hand-glasses. When rooted, pot singly in sixties.

By grafting.—“The early part of May is suitable for grafting *fuchsias*, or rather for inarching them, as this is decidedly the most successful mode of combining more than one variety upon

the same stock. This is very desirable where room has to be husbanded. Cut away to the length of one and a half inch, half the thickness of the two shoots to be united, bind them together; sever through the scion three-fourths of its thickness, just below the junction, keep in a warm moist atmosphere, and in three or four days the junction will be complete. *F. fulgens*, *F. Cormackii* and other strong growing varieties are the best stocks.”—*Gard. Chron.*

To make specimen Fuchsias.—“In order to have specimen plants of *Fuchsias*,” says Mr. G. Watson, “put in cuttings in the beginning of August; planting them round the rims of five inch pots filled with light sandy soil and well drained; then place in a cucumber-frame till sufficiently rooted, and afterwards remove to a cool and airy part of the green-house, and let them remain till February. In that month, pot off into small sixties, and when well rooted in these pots, two or more healthy and well-shaped plants of each variety put into larger pots according to their size. While young, care must be taken that the earth, in which they are growing, does not become soured by over watering, or the plants will soon become sickly. When they have filled these pots with roots, the plants must be removed into larger pots and carefully tied up to sticks in order to keep the leading shoots upright, as several of the varieties have a tendency to grow downward, and it is only with constant care that these varieties are kept vigorous.

“About the second week in June, shift for the last time into pots sufficiently large to bloom them in; in potting particular attention must be paid to the drainage, so that the superabundant water may be easily passed off.

“Plants treated in this manner will begin to bloom profusely at the latter end of July, and continue flowering till the end of September; during this period the pots should be placed in pans, so that the plant may be well supplied with water, and yet not constantly soaked in it.

“Plants thus treated, with their shoots pruned to three or four buds, form beautiful objects for turning out into the flower garden the following summer; but if very large specimens are required, their pot room must be

increased, and they should be grown in the open air.

"Those who cultivate the Fuchsia, with the desire of obtaining it in the greatest perfection, should remember that in its native haunts it flourishes under the shade of loftier shrubs. Reason, therefore, suggests, and experience has proved, that nothing more conduces to its vigour than shading it for three or four hours during the hottest period of the day, and syringing gently every night and morning during hot weather."—*Gard. Chron.*

Winter Protection.—At the approach of frost, that excellent horticulturist, Mr. Mearns, recommends that the plants should be taken out of the soil, and all the laterals cut from them; upon those intended to be trained to a wall, paling, or trellis, leave three, four, five or six canes. They are then ready to be deposited until the end of April, or beginning of May, in a pit in heath or any other tolerably dry soil, or sand, and place them in a sloping direction in the pit with stakes driven here and there diagonally over them, that they may be kept hollow, and to prevent the soil from pressing too much upon their brittle stems.

In covering them use no straw, or matting, but allow the soil to fall amongst them, and form it into a sharp ridge at the top.—*Gard. Chron.*

The laterals removed at the time of this winter-pruning, if divested of their laterals, and packed in powdered charcoal, or perfectly dry earth, in boxes, and placed out of the reach of frost, in a cool place, will retain their vitality until next April, when they may be cut into lengths of about a foot long, and planted with a dibble; insert them into the ground, so as to leave about three inches of the cuttings above the surface in any place where they are wanted to flower next summer. If kept tolerably moist, they will be found to make good flowering plants with little trouble.—*Gard. Chron.*

FUEL is no small item in the annual expenditure of the stove, green-house, and conservatory departments, and therefore deserves consideration.

The specific heat of water being 1, and that of atmospheric air 0.00035, or $\frac{1}{2850}$ th, if the quantity of fuel which will heat a cubic foot of water one degree be multiplied by 0.00035, the pro-

duct will be the quantity of fuel required to heat a cubic foot of air, one degree; and twenty times that quantity will heat it twenty degrees; thirty times will heat it thirty degrees, and so on. Now 0.0075 lbs. of best coals will heat a cubic foot of water one degree; therefore 0.000002625 lbs. of best coals will heat a cubic foot of air one degree.

It is essential to good and profitable fuel that it should be free from moisture; for unless it be dry, much of the heat which it generates is consumed in converting that moisture into vapour: hence the superior value of old dense, dry wood, to that which is porous and damp. A pound of dry will heat thirty-five pounds of water from 32° to 212°; but a pound of the same wood in a moist or fresh state, will not similarly heat more than twenty-five pounds. The value, therefore, of different woods for fuel is nearly inversely as their moisture: and this may be readily ascertained by finding how much a pound weight of the shavings of each loses by drying during two hours, at a temperature of 212°.

The preceding are the average of results obtainable in a common well-constructed furnace. By a complicated form of boiler, perhaps a small saving of fuel, in obtaining the same results, may be effected; but it will be found generally, that the original cost of apparatus, and the current additional expense for repairs, will more than exceed the economy of fuel.—*Prin. of Gard.*

FULL-FLOWER. See *Double-flower*.

FUMARIA. Six species. Hardy annual climbers. Seed. Common soil.

FUMIGATING is employed for the destruction of certain insects; the inhaled vapour or smoke arising from some substances being fatal to them. Tobacco (see *Tobacco*) is the usual substance employed; and it may be ignited, and the smoke impelled upon the insects by *bellows*; or the ignited tobacco may be placed under a box, or within a frame together with the affected plant. The vapour of turpentine is destructive to the scale and other insects, employed in this mode. Mr. Mills has also stated the following as the best mode of fumigating with tobacco.

"According to the size of the place to be fumigated, one or more pieces of cast iron, one inch thick, and three

inches over, are made red hot; (pieces of old tiles, such as are used for covering smoke flues, would probably answer equally well;) one of these is placed in a twenty-four sized pot, on which is put the quantity of tobacco considered necessary to charge the structure with smoke sufficient to destroy insect life. To fumigate an ordinary sized eight-light house, I use three heaters, and three twenty-four sized pots, which I have placed on the front flue or walk; one pound of strong tobacco is put on the three heaters in equal parts, and this I find sufficient to fill the house, so as to destroy all the kinds of insects that perish by fumigation. The system has these advantages: the tobacco is so quickly consumed, that the house is completely filled in a very short time, and but little smoke can escape before the insects are destroyed; the pure heat from the iron heaters prevents injury from gas, and as no blowing is required there is no dust: it being only necessary to put the tobacco on the heaters, and leave the house."—*Gard. Chron.*

FUMITORY. *Fumaria*.

FUNKIA. Five species. Hardy herbaceous. Division. Sheltered light soil.

FURCRÆA. Seven species. Stove succulents. Suckers. Rich light loam.

GÆRTNERA. Two species. Stove evergreen twiners. Cuttings. Loam and peat.

GAGEA. Nineteen species. Hardy bulbous perennials. Offsets. Light soil.

GAGNEBINA. Two species. Stove evergreen shrubs. Cuttings and seeds. Loam and peat, with a little sand.

GAILLARDIA. Four species. Hardy herbaceous perennials. Division. Common soil.

GALACTIA. Four species. Hardy deciduous or stove evergreen twining plants. Cuttings. Division. Seeds. Loam, peat and sand.

GALACTITES. Two species. Hardy annuals. Seeds. Common soil.

GALANGALE. *Kampfer*.

GALANTHUS. Snowdrop. Two species. Hardy bulbous perennials. Offsets. Common soil.

GALAX *aphylla*. Hardy herbaceous perennial. Division. Peaty soil in a moist situation.

GALAXIA. Five species. Green-house bulbous perennials. Offsets. Sandy peat soil.

GALEANDRA *gracilis*. Stove orchid. Division. Sandy peat, and light loam.

GALEGA. Goat's Rue. Five species, and some varieties. Hardy herbaceous perennials. Division or seeds. Common soil.

GALEOBDOLO *Luteum* and variety. Hardy herbaceous perennial. Division. Marshy soil.

GALIPEA. Two species. Stove evergreen shrubs. Cuttings. Peaty soil.

GALL is a tumour, formed in consequence of the part being punctured by an insect, the tumour becoming the nidus of the insect brood. The Oak apple caused by the *Cynips quercus* is a familiar example; as also are the bunches of leaves not unlike a rose on the Rose Willow, and the mossy tufts on the twigs of the wild rose, and erroneously called *Bedeguar*.

GALPHINIA. Two species. Stove evergreens; one a shrub; one a climber. Ripened cuttings. Loam and peat.

GAMBOGE. *Garcinia Gambogia*.

GAMMA MOTH. See *Noctua*.

GANGRENE. See *Canker*.

GARCINIA. Four species. Stove evergreen fruit trees. Ripened cuttings. Light loamy soil with peat. They require a strong moist heat.

GARDEN BALSAM. *Justicia pectoralis*.

GARDEN BEETLE. See *Phyllorpertha*.

GARDEN PEBBLE MOTH. See *Scopula*.

GARDENING. "Herder, in his *Kalligone*, calls gardening the second liberal art, architecture the first. 'A district,' says he, 'of which every part bears what is best for it, in which no waste spot accuses the indolence of the inhabitants, and which is adorned by beautiful gardens, needs no statues on the road; Pomona, Ceres, Pales, Vertumnus, Sylvan and Flora meet us with all their gifts. Art and nature are there harmoniously mingled. To distinguish, in nature, harmony from discord; to discern the character of every region with a taste which develops and disposes to the best advantage the beauties of nature—if this is not a fine art, then none exists.' However true it may be, that gardening deserves to be called a fine art, we can hardly agree with Herder, that it is the second in the order of

time; for though gardens must have originated soon after man had advanced beyond the mere nomadic life, yet the practice of gardening as a fine art, that is, not merely as a useful occupation, must necessarily have been of a much later date. The hanging gardens of Semiramis are reckoned among the wonders of the world; but that which astonishes is not therefore beautiful. Scaffoldings, supported by pillars, covered with earth, bearing trees, and artificially watered, are, no doubt, wonderful; but we have no reason to suppose them beautiful. The gardens of the Persians (paradises), are called by Xenophon delightful places, fertile and beautiful; but they seem rather to have been places naturally agreeable, with fruit-trees, flowers, &c., growing spontaneously, than gardens artificially laid out and cultivated. Whether the Greeks, so distinguished in the fine arts, neglected the art of gardening, is a question not yet decided. The gardens of Alcinoüs (*Odyssey*, vii., 112—132) were nothing but well laid out fruit orchards and vineyards, with some flowers. The grotto of Calypso (*Odyssey*, v., 63—73) is more romantic, but probably is not intended to be described as a work of art. The common gardens which the Greeks had near their farms, were more or less like the gardens of Alcinoüs. Attention was paid to the useful and the agreeable, to culinary plants, fruits, flowers, shadowing trees and irrigation. Shady groves, cool fountains, with some statues, were the only ornaments of the gardens of the philosophers at Athens. The descriptions of gardens in the later Greek novelists do not show any great progress in the art of gardening in their time; and it would be worth while to inquire, whether the same cause, which prevented the cultivation of landscape painting with the ancients, did not also prevent the progress of the art of gardening. The ancients stood in a different relation to nature from the moderns. The true art of gardening is probably connected with that element of the romantic, which has exercised so great an influence on all arts ever since the revival of arts and letters, and, in some degree, ever since the Christian era. Even the grottoes of the ancients owed their origin merely to the desire for the coolness they afforded. Natural grottoes led to artificial ones, which were

constructed in the palaces in Rome, and in which, as Pliny says, nature was counterfeited. But a grotto does not constitute a garden; and that the Romans had no fine gardens, in our sense of the word, is proved by several passages of their authors, and by the accounts we have of their gardens. In Pliny's description of his Tuscan villa, we find, indeed, all conveniences—protection against the weather, an agreeable mixture of coolness and warmth; but everything beautiful relates merely to buildings, not to the garden, which, with its innumerable figures of box, and in its whole disposition, was as tasteless as possible. Of the gardens of Lucullus, Varro says, that they were not remarkable for flowers and fruits, but for the paintings of the villa. A fertile soil, and a fine prospect from the villas, which were generally beautifully situated, seem to have satisfied the Romans. Whatever the art of gardening had produced among them, was, with every other trace of refinement, swept away by the barbarians who devastated Italy. Charlemagne directed his attention to this art, but his views did not extend beyond mere utility. The Troubadours of the middle ages speak of symmetrical gardens. In Italy, at the time of the revival of learning, attention was again turned towards pleasure gardens, some of which were so famous, that drawings were made of them. They may have been very agreeable places, but we have no reason to suppose them to have exhibited much of the skill of the scientific gardener. At a later period, a new taste in gardening prevailed in France. Regularity was carried to excess; clipped hedges, alleys laid out in straight lines, flower-beds tortured into fantastic shapes, trees cut into the form of pyramids, haystacks, animals, &c., were now the order of the day. The gardens corresponded with the taste of the time, which displayed itself with the same artificial stiffness in dress, architecture and poetry. Lenotre was the inventor of this style of French gardening, which, however, his successors carried to greater excess. Nothing natural was left, and yet nature was often imitated in artificial rocks, fountains, &c. Only one thing strikes us as truly grand in gardens of this sort—the fountains, which were constructed at great expense.

The Dutch imitated the French. The English were the first who felt the absurdity of this style. Addison attacked it in his famous Essays on Gardening, in the Spectator; and Pope, in his fourth Moral Epistle, lashed its petty, cramped and unnatural character, and displayed a better taste in the garden of his little villa, at Twickenham; crowds followed him, and practice went before theory. (See Horace Walpole's *History of Modern Taste in Gardening*.) This style, however, was also carried to excess. All appearance of regularity was rejected as hurtful to the beauty of nature, and it was forgotten, that if in a garden we want nothing but nature, we had better leave gardening altogether. This extreme prevailed, particularly after the Oriental and Chinese style (see Chambers' *Dissertations on Oriental Gardening*) had become known. What in nature is dispersed over thousands of miles, was huddled together on a small spot of a few acres square—urns, tombs; Chinese, Turkish and New Zealand temples; bridges, which could not be passed without risk; damp grottoes; moist walks; noisome pools, which were meant to represent lakes; houses, huts, castles, convents, hermitages, ruins, decaying trees, heaps of stones; —a pattern card of every thing strange, from all nations under heaven, was exhibited in such a garden. Stables took the shape of palaces, kennels of Gothic temples, &c.; and this was called nature! The folly of this was soon felt, and a chaster style took its place. At this point we have now arrived. The art of gardening, like every other art, is manifold; and one of its first principles, as in architecture, is to calculate well the means and the objects. Immense cathedrals and small apartments, long epics and little songs, all may be equally beautiful and perfect, but can only be made so by a proper regard to the character of each. Thus the climate, the extent of the grounds, the soil, &c., must determine the character of a garden. Aiken justly observes, that nothing deviates more from nature, than the imitation of her grand works in miniature. All deception ceases at the first view, and the would-be magnificent garden appears like a mere baby house. Let the character of the agreeable, the sublime, the awful, the sportive, the rural, the neat, the romantic, the fan-

tastic, predominate in a garden, according to the means which can be commanded. This is not so easy as might appear at first, and it requires as much skill to discover the disposition which should be made of certain grounds, as to carry it into effect; but if such skill were not required, gardening would not be an art. Another principle, which gardening has in common with all the fine arts, is, that it is by no means its highest aim to imitate reality, because reality will always be better than imitation. A gardener ought to study nature, to learn from her the principles and elements of beauty, as the painter is obliged to do; but he must not stop there. As another general remark, we would observe, that the true style of gardening lies between the two extremes. It is by no means a reproach to a garden that it shows the traces of art, any more than it is to a drama. Both, indeed, should follow nature; but in respect to the fine arts, there is a great difference between a free following of nature and a servile copy of particular realities. Tieck, in his *Phantasien*, does not entirely reject the French system; at least, he defends the architectural principle as one of the principles of the art of gardening. There are many works of great merit on gardening, of which we only mention *Descriptions des nouveaux Jardins de la France*, &c., by La Borde (Paris, 1808 to 1814), the most complete for descriptions; Loudon's *Encyclopædia of Gardening*, 5th edit., (London, 1827;) *Handbuch der schönen Gartenkunst*, by Dietrich (Giessen, 1815); Hirschfeld's *Theorie der Gartenkunst* (Leipsic, 1779), 5 vols., 4to., with many engravings, a work of very great merit, and still of considerable use; *Le bon Jardinier, Almanach pour l'Année 1830*, edited by A. Poiteau (Paris), 1022 pages. (See the article *Horticulture*.) — *Encyclopædia Americana*.

GARDENER. The day is gone when the spade and the blue apron were the only appropriate devices for the gardener; he must now not only have a thorough practical knowledge of his art, but he must also have an intimate acquaintance with its sciences. No man can have stored in his mind too much knowledge, but there are always some branches of information of more value than others; of these to the gar-

dener there are none so important as botany and chemistry. Botany, physiological as well as classical. Chemistry, especially as applied to the examination of organic nature.

GARDENIA. Twenty-seven species and two varieties. Stove or green-house evergreen shrubs. Cuttings. Loam and peat.

GARDEN ROCAMBOLE. *Allium ophioscordon.*

GARDEN SWIFT. See *Hepialus*.

GARDOQUIA. Five species. Stove or green-house evergreen shrubs. *G. betonicoides* is an herbaceous perennial. Cuttings. Sand, loam, and peat.

GARLAND FLOWER. *Pleurandra Cneorum.*

GARLICK. *Allium sativum.* Is capable of growing in almost any soil.

Mode and Time of Planting.—It is generally propagated by parting the root, but may be raised from the bulbs produced on the stems. The planting may be performed any time in February, March, and early in April; but the middle of the second is the usual time of insertion. A single clove to be placed in each one of holes made six inches apart, and one and a half deep, in straight lines, six inches distant from each other; care being taken to set the root downwards: to do this it is the best practice to thrust the finger and thumb, holding a clove between them, to the requisite depth without any previous hole being made. The only cultivation is to keep them clear of weeds, and in June the leaves to be tied in knots to prevent their running to seed, which would greatly diminish the size of the bulbs. A few roots may be taken up as required in June and July, but the whole must not be lifted until the leaves wither, which occurs at the close of this last mentioned month, or in the course of August. It is usual to leave a part of the stalk attached, by which they are tied into bundles, being previously well dried for keeping during the winter.

GARLIC PEAR. *Cratava.*

GARRYA elliptica and laurifolia. Hardy evergreen shrubs. Layers. Loamy soil.

GARUGA primata. Stove evergreen tree. Cuttings. Loam and peat.

GASTERIA. Forty-two species and many varieties. Green-house evergreen shrubs. Suckers or leaves. Sandy loam,

leaf mould and peat, with a little bush rubbish.

GASTONIA palmata. Stove evergreen shrub. Cuttings. Sand, loam, and peat.

GASTROCARPIA runcinata. Half-hardy herbaceous perennial. Seeds. Common soil.

GASTROCHILUS pulcherrimus. Stove herbaceous perennial. Division. Sandy loam.

GASTROLOBIUM. Three species. Green-house evergreen shrubs. Half ripened cuttings. Loam, peat, and sand.

GASTRONEMA clavatum. Green-house bulbous perennial. Offsets. Rich mould.

GATHERER. The hand is the best instrument for collecting fruit into the basket, but to avoid the danger and breakage of branches unavoidably incidental to using long ladders, the following instruments have been designed. Fig. 54, for apples and other single fruit, Fig. 55, for grapes, the branches of which it severs and retains in its grasp.

Fig. 54.

Fig. 55.



GATHERING. See *Fruit Room*.

GAUDICHAUDIA cynanchoides. Stove evergreen twiner. Ripe cuttings. Light turfy loam and peat.

GAULSHERIA. Four species. Hardy or green-house evergreen shrubs. *G. procumbens*, a creeper. Layers. Peat soil.

GAURA. Eight species. Chiefly hardy plants. *G. fruticosa*, increases by cuttings. The perennials by seed: they thrive in a rich soil. The annuals and biennials. Seeds. Common soil.

GAZANIA. Five species. Green-house herbaceous perennials or evergreen shrubs. Cuttings. Peat and loam.

GEISSOMERIA longiflora. Stove evergreen shrub. Cuttings. Rich soil of loam and rotten dung.

GEISSORHIZA. Eleven species and a few varieties. Green-house bulbous perennials. Offsets. Sandy peat.

GEITONOPLESIMUM. Three species. Green-house herbaceous perennials. *G. cymodum*, is an evergreen twiner. Cuttings. Peat and loam, or sandy peat.

GELA. Two species. Green-house evergreens. Cuttings. Sandy peat.

GELASINE *azurea*. Green-house bulbous perennial.

GEM. See *Bud*.

GENISTA. Forty-nine species and a few varieties. Chiefly hardy evergreen shrubs. A few deciduous or evergreen trailers and shrubs. For the green-house or half hardy kinds, cuttings, loam, peat, and sand. The hardy kinds are increased by layers or seeds.

GENTIANA. Fifty-eight species and some varieties. Hardy plants. The herbaceous kinds for the most part grow well in a rich peaty soil, and may be increased by division. The annuals and biennials by seeds. Common soil.

GENTIANELLA. *Gentiana acaulis*. Is a hardy and herbaceous creeper. Sow the seeds of this as soon as they are ripe, (otherwise they soon lose the power of vegetation,) in pans filled with rather heavy peat. Sow on the surface, without any covering except a slight sprinkling of silver sand; then place the pans either in a cold frame facing the north, and kept close, or on the north side of a wall, where they are completely screened from the sun, and cover them with a hand-glass.

Soil.—A light loam suits it best; manured annually with leaf mould. If the subsoil is dry, the soil may be advantageously more clayey.

GEOMETRA. The *Amphidasis* of some entomologists, is a genus of moths; including *G. polosaria*. Pale Brindled Beauty Moth which appears in March; eggs deposited in bands round a twig, as done by the Lacky Moth. Caterpillars appear with the opening leaves of the elm, lime, lilac, and apple tree. They are at first a light green.

G. defoliaria, Lime Looper, or Mottled Umbre Moth, feeds on the leaves of the lime and apple. Moth appears in November. Caterpillar reddish, with a bright yellow stripe on each side. Female moth has no wings, so that a

piece of cloth dipped in tar and bound round a tree's stem prevents its ascent.

G. piniaria attacks the pine and fir tribe.

GEONOMA. Six species. Palms. Seed. Rich sandy loam, and a strong heat.

GERANIUM. Fifty-one species and some varieties. Chiefly hardy herbaceous perennials. The green-house and frame kinds increase from cuttings or seeds, and grow well in a mixture of loam and peat, and vegetable soil. The hardy species and the annuals increase from seeds, and require only common soil. See *Pelargonium*.

GERARDIA. Seven species. Hardy annuals, biennials, and herbaceous perennials. Seed or cuttings. Peaty soil.

GERBERA *crenata*. Green-house biennial. Seeds. Sandy loam and peat.

GERMINATION is the sprouting, or first step in vegetation of a seed. To enable it to germinate, it must have a perfectly-developed embryo, and be ripe, or nearly ripe. It must not be too old.

The following list, furnished by the late Mr. Loudon, shows the greatest age at which some of our common garden seeds germinate freely; and this result of experience is quite concurrent with our knowledge of their chemical constitution:—

“One year.—Peas, beans, kidney beans, carrot, parsnip, oraches, herbpattience, rhubarb, elm, poplar, and willow. Two years.—Radish, salsafy, scorzonera, purslane, the alliums, cardoon, rampion, alisander, love-apple, capsicum, egg-plant. Three years.—Sea-kale, artichoke, lettuce, marigold, rue, rosemary. Four years.—Brassicas, skirret, spinach, asparagus, endive, mustard, tarragon, borage. Five and six years.—Burnet, sored, parsley, dill, fennel, chervil, hyssop. Ten years.—Beet, celery, pompion, cucumber, melon.”

Mr. Loudon may be safely received as good authority on subjects which he investigated. If the age at which the vitality of certain seeds cease in England as expressed herein, be correct, it proves a result in that climate different from our own. For instance, peas, beans, carrots, &c., vegetate freely in the United States when two or three years old, sea-kale seldom after the first year, and so of other seeds enumerated in the list.

A certain degree of *warmth* is essential; for no known plant has seed that will germinate below or at the freezing point of water. A temperature above 32° of Fahrenheit's thermometer therefore is requisite. But on the other hand, the temperature must not be excessively high. Even no tropical seed, probably, will germinate at a temperature much above 120° F., and we know from the experiments of M. M. Edwards and Colin, that neither wheat, oats, nor barley will vegetate in a temperature of 113°.

Every seed differing in its degree of excitability, consequently, has a temperature without which it will not vegetate, and from which cause arise the consequences that different plants require to be sown at different seasons, and that they germinate with various degrees of rapidity. The gardener should always bear in mind that it would be a very erroneous conclusion, because a seed does not germinate at the accustomed time, that therefore its vegetating powers are departed. No two seeds taken from the same seed-vessel germinate precisely at the same time; but on the contrary, one will often do so promptly, while its companion seed will remain dormant until another year.

M. de Candolle relates an instance where fresh tobacco seedlings continued to appear annually for ten years on the same plot, though no seed was sown after the first sowing; and the same phenomenon usually occurs for two or three years, when the seed of either the peony or hawthorn are sown. Why one seed is more easily excited than another is as yet unexplained; but the wisdom of this one of many provisions for avoiding the accidental extinction of a species in any given locality is readily discerned. An ungenial spring may destroy the plants from those seeds which first germinated; but this could scarcely occur also to those of the second and third year, or even to those which were only a few weeks later in their vegetation.

It is not possible to enunciate a general rule relative to germinating temperatures, requiring no exceptions; but in general, for the seeds of plants, natives of temperate latitudes, the best germinating temperature is about 60°, and for those of tropical plants about 80°; and the necessity for such temperatures depends upon the same causes

that prevent the incubation of eggs, unless they be kept for a certain period at a temperature of about 100°.

As no seed will germinate unless a certain degree of heat is present, so also does it require that a certain quantity of *water* is in contact with its outer skin or integument; and this is required not only to soften this covering, and thus permit the enlargement of the cotyledons (seed lobes) always preceding germination, but also to afford that water to internal components of the seed, without which the chemical changes necessary for the nutriment of the embryo plant will not take place. As water is essential to germination, and only a certain quantity is required for its healthy progress, so is it by no means a matter of indifference what matters it holds in solution. Until germination has commenced, no liquid but water at common temperatures will pass through the integuments of a seed.

So soon as germination has commenced, this power to exclude foreign fluids ceases; but the organs starting into activity, the radicle and the plumule are so delicate, that the weakest saline solutions are too acrid and offensive for them. It may be noted as a warning to those who employ steepes for seed, with the hope of promoting the vigour of the future plant, that they must keep the seed in those steepes a very few hours. In forty-eight hours, if the temperature be 60° or more, putrefaction commences, and germination is weakened, or entirely destroyed. M. Vogel, of Munich, has published an extended course of experiments upon this subject, and they fully confirm my opinion that salts, innocuous when the plant is of robust and advanced growth, are fatal to it at the time of germination.

The presence of one of the constituent gases of the atmosphere, *oxygen*, is also essential to germination. It is necessary that the oxygen should penetrate to the cotyledonous parts of the seed, as is evident by the changes which take place during germination, and it is further proved by experiment. When healthy seed is moistened and exposed in a suitable temperature to atmospheric air, it absorbs the oxygen only. This power of separating one gas from the others appears to reside in the integuments of the seed, for old seeds lose the power of absorbing the oxygen,

and, consequently, of germinating; yet they will frequently germinate if soaked in an aqueous solution of chlorine—a gas which has the power of attracting hydrogen from water, and others of its compounds, and releasing the oxygen, doing so in the case of seeds within their integuments, as well as without-side. Humboldt and Saussure have also shown that the application of chlorine to seeds accelerates its germination; and Cress seed, which under ordinary circumstances requires some days to complete the process, they found effected it in no more than three hours. The late Mr. George Sinclair, author of the excellent *Hortus Gramineus Woburnensis*, also informed me that he employed chlorine with singular success. He obtained it by mixing a tablespoonful of muriatic acid with a similar quantity of black oxide of manganese, and half a pint of water. After allowing the mixture to remain two or three hours, the seed is to be immersed in the liquid for a similar period, and then sown. Another, and I consider the most eligible mode of applying the chlorine was also suggested to me by the same distinguished horticulturist. In this way he said he made tropical seeds vegetate which refused to germinate by other modes of treatment. He placed the mixed ingredients mentioned above in a glass retort, inserting its bulb in the hot-bed, and bringing its beak under the pot in which the seeds were sown, connecting it with the draining aperture of the pot. The chlorine gas is gradually evolved, passing through the earth of the pot to the seeds, with more or less rapidity, according to the heat employed. This absolute necessity for the presence of oxygen is a reason why seeds will not germinate if buried beyond a certain distance from the earth's surface; and why clayey soils often fail of having a good plant, an impervious coat of the clay enveloping the seed, and preventing the air's access. How oxygen operates in aiding the seed to develop the parts of the embryo plant, we cannot even guess—we only know that most seeds have more carbon (pure charcoal) in their composition than other parts of their parent plant; that the oxygen absorbed by the seeds combines with a portion of that carbon, and is emitted in the form of carbonic acid. These are the attend-

ant phenomena,—but we can penetrate the mystery no farther.

I have never been able to discover that *light* has injurious influence over germination, and in those experiments apparently proving the contrary, due care was not taken to prevent the seed being exposed to a greater degree of dryness as well as to light.

If seed be placed on the surface of a soil, and other seed just below that surface, and care be taken to keep the former constantly moist, it will germinate just as speedily as the buried seed, and if exposed to the blue rays only of the spectrum by being kept under a glass of that colour, even more rapidly. Therefore the object of sowing the seed below the surface, is for the purposes of keeping it in a state of equable and salutary moisture, as well as to place the radicle in the medium necessary for its growth into a root, immediately it emerges from the integument of the seed. These facts hold out some beacons worthy of being attended to, as guides for the operation of sowing.

They point out that every kind of seed has a particular depth below the surface at which it germinates most vigorously, as securing to it the most appropriate degree of moisture, of oxygen gas, and of warmth. From a quarter of an inch to two inches beneath the surface, appear to be the limits for the seeds of plants; but they usually vary for the same seeds in different grounds and countries. It must be the least in aluminous soils and dry climates. In general, sowing should be performed in dry weather, especially on heavy soils, not only because of the greater saving of labour, but because it prevents the seed being enveloped with a coat of earth impermeable by the air, “which,” says Sir H. Davy, “is one cause of the unproductiveness of cold clayey soils.” Perhaps the time at which any ground may be raked with the greatest facility is as good and practical a criterion as any to judge when it is fit for sowing. In general, if clay does not predominate in its constitution, a soil rakes best just after it has been turned up with the spade. If clay does predominate it usually rakes with most facility after it has been dug two or three days, and then immediately after a gentle rain. But it is certain that the sooner seed is

sown after the soil is dug for its reception, the earlier it germinates. In the droughts of summer, water is often required to newly-sown beds. Such application must not be very limited or transitory; for if the soil is only moistened at the immediate time of sowing, it induces the projection of the radicle, which in very parching weather, and in clayey, caking soil, I have known wither away, and the crop be consequently lost from the want of a continued supply of moisture.—*Princ. of Gardening.*

GEROPOGON. Old Man's Beard. Three species. Hardy annuals. *G. calyculatus* an herbaceous perennial. Seeds. Common soil.

GESNERA. Thirty species, and two varieties. Stove herbaceous perennials, or evergreen shrubs. Cuttings. Rich light soil.

GETHYLLIS. Five species. Greenhouse bulbous perennials. Offsets or seeds. Sandy loam and peat.

GETONIA. Two species. Stove evergreen climbers. Cuttings. Loam and peat.

GEUM. Twenty-three species, and a few varieties. Hardy herbaceous perennials. Division or seeds. Rich light loamy soil.

GILIA. Eight species, and one variety. Hardy annuals. Seeds.—Common soil. *G. aggregata*; a greenhouse biennial.

GILLENIA. Two species. Hardy herbaceous perennials. Division. Peat and loam.

GILLYFLOWER. See *Mathiola*.

GINGER. *Zinziber*.

GINGERBREAD TREE. *Parinarium macrophyllum*.

GIPTSY MOTH. See *bombyx*.

GIRDLING is a mode of killing trees adopted in clearing the forests of America, by cutting, early in the spring, a girdle or ring round the stem of each tree, taking away not only the bark but the entire alburnum down to the hard wood—the ascent of the sap is thus prevented. See *Ringling*.

GLADIOLUS. Forty species; many varieties. Chiefly greenhouse, and a few hardy bulbous perennials.

G. cardinalis. On the culture of this we have the following information from Mr. A. Mackenzie and Mr. Gordon:—

“*Gladiolus cardinalis*, and its hy-

brids, are the next in beauty to *G. psittacinus*, but they are not so hardy nor so vigorous. They require taking up every season; for if left in the ground, though protected with a covering, they always suffer from damp, and never start early enough to flower well the next season.

“About the beginning of October, to propagate them, take from well-established plants a cluster of corms about one and a half or two feet in circumference, and plant them one foot apart, and two or three inches deep, in beds two feet wide, with a little sand at the bottom of the bulbs. When forced, this plant forms a brilliant ornament for the greenhouse in the beginning of summer.

“In the month of October take eight or twelve-sized pots, and fill them with as large a mass of the strongest corms as the pots will admit, and protect them till they are required for forcing.”—*Gard. Chron.*

“*Gladiolus psittacinus* or *natalensis*, is one of the most ornamental of the *Cape gladioli*, and, from its easy cultivation, deserves to have a place in all flower-gardens where a brilliant display is required during the autumn. Beds should be prepared some time during the winter, or early in the spring, by digging up the soil deep and leaving it rough, adding, at the same time, a good portion of well-rotted dung and a little sand, if the soil is of a stiff nature; but if light, sand is not required.

“About the middle of April mark out the bed into rows, one foot apart and four inches deep, putting a little sand along the bottom of the rows; then place the bulbs in the rows, about nine inches or one foot apart, taking care to separate all the bulbs, and only plant one in each place; then, having a little sand (any refuse from cutting pots, or bank-sand, will do), put a small portion round each bulb, and fill in the rows. After this the plants will require no further trouble except keeping clean and tying up, which latter is easily done by driving a few sticks round the outside of the bed, and running a couple of tiers of tar-twine round it. With this treatment the gladioli will begin flowering about the end of July, and will continue blooming for nearly two months, particularly if they

are freely supplied with water once or twice (as the season may require) just before they begin to expand their first flowers. Care must be taken, however, not to water them overhead.

"The bulbs to be taken up about the end of October, or as soon as the stems and leaves become brown or damaged by the frost. They must be well dried, and placed in some situation secure from frost or damp until the next spring, when they must be divided, and again treated as before. The large bulbs will also produce numerous offsets round their root-end; but these are of little value, for they will be two or three years before they flower; and as every flowering bulb planted in the spring produces three or four bulbs of sufficient size to bloom next season, from the crown of the old one, there is always enough for all purposes. The plant also flowers freely; but the small bulbs and the seedlings will be so long before they flower, that they are not worth the trouble of raising, except for the sake of obtaining new varieties."—*Gard. Chron.*

"*Gladiolus ramosissimus* is the next most beautiful kind for growing either in pots or in a bed. The bulbs of these hardier kinds should be taken up every two years, divided, and replanted, as they will not flower so finely if left too long in one place.

"They require a rich soil, made rather free by adding a little sand to it when the bulbs are being planted. By this treatment nearly all the cape gladioli may be made to flower beautifully, and far finer and better than if retained in pots. They are easily increased by offsets or by seeds; but the latter way is rather tedious, and only worth resorting to for the sake of raising new varieties. When this is intended, the seed should be sown about the end of February, in pans filled with a mixture of sandy peat, and loam, and leaf-mould. The seeds should be planted about half an inch deep in the soil, and the pans placed in a green-house.—They will soon vegetate, and require little trouble, for the first season, except watering and keeping free from slugs and weeds, taking care, however, that they are kept growing as vigorously and as long as possible by freely supplying them with water during the growing season. When they

have done growing for the season, care must be taken not to dry the soil in the pans too quickly or too much; for the young bulbs, being very small, are apt to become much exhausted, and frequently perish if kept very dry the first winter. They should be, if possible, placed in some cool, dry situation, where they are secure from frost. In the spring they should be again placed in a green-house or warm pit, and, when fairly started, they should be carefully removed into fresh pans or pots, being rather a richer soil than that used for the seeds, planting them still rather thickly in the pots or pans, and keeping them shut up close and rather moist for a few days, until they begin to grow again, after which treat them as before, and encourage them to grow as long as possible in the autumn, then rest them as before. The next spring they may be potted in smaller pots, and treated like the *Gladiolus cardinalis*, when many of them will flower."—*Gard. Chron.*

GLASS is the best agent employed by the gardener to exclude the cold, whilst the light is admitted to his plants which are natives of hotter climates than that in which he cultivates them. Now that the excise-duty is removed from glass, the gardener is enabled to employ the best, and a thicker kind than formerly, when the duty was high in proportion to the good quality and weight. Anxiety to obtain the best glass for hot-houses, &c., is every way laudable; but the benefit sought for is frustrated if it be not constantly well cleansed. The best glass, if dirty, allows fewer rays of light to pass through than inferior glass kept bright. A thorough cleansing should be given both to the outside and inside twice annually, during the first weeks of February and of October, and a third cleansing, on the outside only, at the end of June. In proportion to the deficiency of light does the plant under glass become, in the gardener's phraseology, *drawn*; that is, its surface of leaves becomes unnaturally extended, in the vain effort to have a sufficient elaboration of the sap effected by means of a large surface exposed to a diminished light, for which a less surface would have been sufficient if the light were more intense. The plant with this enlarged surface of leaves becomes

unfruitful, the sap being expended in their production which should have been appropriated to the formation of fruit.

GLASS-CASES are of various kinds. One is formed of glazed wooden frames, fitting together, to protect espaliers, wall-trees, or shrubs too large to be covered with a hand-glass.

Another glass-case is made for protecting a single branch. It is thus described by Mr. Maund, the author of

that most useful periodical the *Botanic Garden*:—



“Although my experiment is not yet completed, I cannot omit mentioning to you its success. Grapes grown on open walls in the midland counties are rarely well-ripened; therefore this year I provided a small glazed frame, a sort of narrow hand-glass, of the shape shown in the annexed outline, to fix against the wall, and inclose one branch of the vine with its fruit and foliage.

“The open part, which rests against the wall, is thirteen inches wide, and may be of any length required to take in the fruit. The sides are formed of single panes of glass, seven inches wide, and meet on a bar which may represent the ridge of a roof, the ends inclosed by triangular boards, and having a notch to admit the branch. This was fixed on the branch a month before the vine came into flower. The consequence was, the protected branches flowered a week earlier than the exposed. The frame was not fitted closely to the wall, but in some places may have been a quarter of an inch from it. The lateral branches being shortened before it was fixed, it did not require removal even for pruning, because I adopt the long-rod mode of training, which is peculiarly adapted to my *partial protection system*. The temperature within the frame is always higher than without, sometimes at mid-day even from 20° to 30°.

“By this simple protection I find grapes may be ripened from three weeks to a month earlier than when wholly exposed, and this saving of

time will, I believe, not only secure their ripening well every year in the midland counties, but also that such advantage will be available in the north of England, where grapes never ripen on the open walls.”

Lastly, there is the *Wardian-case* to cover plants growing in rooms, preserving to them uniform moisture and excluding dust. To prevent the dew which is occasionally deposited inside the glass, it is only necessary to open the case frequently, for a few minutes, to render the temperature

Fig. 57.

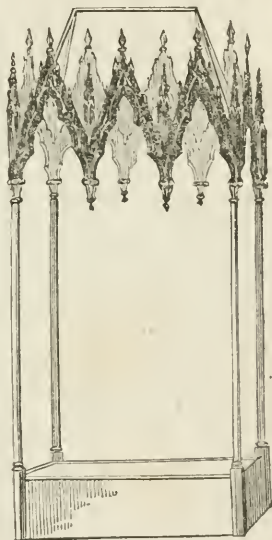
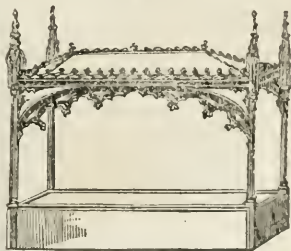
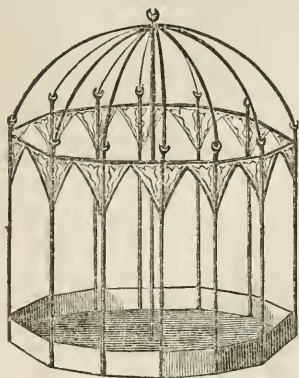


Fig. 58.



within similar to that outside. They are not intended to exclude the air, and are now made very ornamental.

Fig. 59.



GLASTONBURY THORN. *Crataegus oxyacantha*.

GLAUCIUM. Six species, one variety. Hardy annuals and biennials. Seeds. Common soil.

GLAUX *maritima*. Hardy herbaceous trailer. Seeds. Open sandy loam.

GLAZING. See *Stove*.

GLEDITSCHIA. Ten species, besides varieties. Hardy deciduous trees. Seeds. Any soil suits them.

GLEICHENIA. Five species. Stove herbaceous perennials. Division. Peat and loam.

GLOBE-AMARANTH. *Gomphrena*.

GLOBE-FLOWER. *Trollius*.

GLOBE-THISTLE. *Echinops*.

GLOBULARIA. Nine species. Hardy or green-house herbaceous perennials. Cuttings or seed. The green-house species thrive in loam and peat; the hardy kinds in sandy light soil.

GLOBULEA. Sixteen species, besides varieties. Green-house herbaceous perennials. Cuttings. Sandy loam and peat, with brick rubbish.

GLORIOSA. Four species. Chiefly stove bulbous perennials. Division; also seeds sown as soon as gathered. Turfy loam, white sand, and peat.

G. superba.—Mr. W. Scott, of Bury Hill, gives these particulars as to its culture:—

“It naturally requires about six

months' rest, and will seldom start for growth before March, when it will require a good bottom heat of at least 80°, either in a bark-pit or cucumber-bed. The greatest error committed with regard to its treatment is leaving the root to start in the same pot, &c., it grew in in the previous year. As it makes its shoot from the lower end of the new tuber, which is consequently at the bottom of the pot, if it is not taken out, and that end placed upwards, it has to struggle through the whole mass of mould to reach the surface, which it often fails in doing. It should be potted at the beginning of March in a forty-eight pot; or, if the tuber (which sometimes happens) is too long, a bulb-pot may be used. It should be well drained, and planted in pure light peat or heath mould, with the end of the root just above the surface. When it makes a shoot, it also forms fresh roots from the base of the new shoot, and will grow rapidly if kept in a stove or vinery at a temperature of 70° or 80°, and soon requires a larger pot. It generally takes a six, using nothing but light peat soil.

“It may then be trained in any form most convenient. After it has flowered and the leaves are decayed withhold water entirely to ripen the tubers, which may be kept in the dry mould till the spring, or taken out and kept in dry sand till the season for potting them.”—*Gard. Chron.*

GLOSSODIA. Two species. Green-house orchids. Offsets. Sandy loam and peat.

GLOXINIA. Five species. Stove herbaceous perennials. All are propagated by seed, but *G. maculata* is also increased by division; and the others by leaves taken off close to the stem. Loam, peat, and sand, with leaf mould.

Varieties.—Many varieties have been raised by cross-impregnation, but for a private garden the following may be recommended:—*G. coccineus*; *G. Youngii*; *G. Manglesii*; *G. rubra*; *G. Mazima*; *G. speciosa*; and *G. candida*.

Mr. J. McL., of Hillsborough, gives the following directions for the culture of these flowers:—

“*Propagation.*—The gloxinia is readily increased by seeds and cuttings; the seeds should be sown very thinly, as soon as they are gathered, in pans that are well drained, and filled with a

mixture of fine peat and sand; the seeds should not be covered; they may afterwards be placed in a frame where the temperature is about 68°. When they have acquired one or two leaves, they should be potted off into small pots, and not dried off until the second year, as the small fibres are not sufficiently strong to cause them to grow vigorously in spring. This remark is also applicable to young plants raised from cuttings.

"Gloxinias are readily propagated even by a single leaf pressed firmly into the soil, which may be the same as is used for seeds.

"*Culture*.—The roots should be allowed to become quite dry during autumn, and continue so all the winter; they should not be allowed to become dry, however, all at once, but by degrees. While they are in this state the pots may be laid on their sides, on a dry shelf in the green-house until February or March, but February is the best time for starting them. In potting them, the earth should be carefully shaken from the bulbs, which should be repotted in a mixture of one-half decayed vegetable mould, and one-half good rich loam, with the addition of a little sand or charcoal.

"The pots should be well drained. In planting, press the roots gently on the surface of the soil, and give them no water for some time, as the moisture of the pot will be sufficient for them at first.

"After they are all potted, remove them to a frame where the temperature is about 60°, and when they have commenced growing, give them a little water, increasing the quantity as they advance in growth. A little air should be given them in fine weather.

"By the middle of May they will have attained a good size, and some of them will be showing flowers, when they may be removed to the green-house, when nothing except proper attention to watering them is required. When the plants have done flowering, water should be gradually withheld.

"It often happens, however, that some of the species continue in a growing state all the winter, for instance, *G. caulescens*, which is unlike any of the others in habit and manner of growth."—*Gard. Chron.*

GLYCINE. Eight species. Stove or

green-house evergreens; chiefly twiners. Seeds. Loam, peat, and sand.

GLYCIRRHIZA. Liquorice. Eight species. Hardy herbaceous perennials. Slips from the roots with eyes. Planted in the spring. Light sandy soil. See *Liquorice*.

GLYPHYTERYX. A genus of moths.

"*G. Roesella*, Spinach Moth, appears in the spring and throughout the summer. It is blackish-brown coloured. Caterpillar yellowish green. Feeds on spinach, strawberry blite, &c., and lives three or four together, under a web on the leaves."

Mr. Curtis says, that "when fully fed the caterpillars leave the plants on which they have been subsisting, and seek some crack in a tree or wall, where they spin a slight cocoon, and change to pupa; in this state they remain ten or twelve days, when the perfect insect emerges. The moth, when its wings are expanded, is about five lines long; the head, body, and feet are black, with a shining metallic appearance. The antennæ are black with white rings, and the upper wings are yellow, with black edges, and about five silvery spots disposed in the shape of a cross; the under wings are blackish, and, as well as the upper, have long fringes. It is difficult to find means to destroy so minute an enemy as the present; but where it attacks spinach it is much better to pull up the plants with the caterpillars on them, and burn them; where they appear only in small quantities, hand-picking may answer very well."—*Gard. Chron.*

GMELINA. Five species. Stove or green-house evergreen trees. Cuttings. Rich loam and peat, and a very strong heat.

GNAPHALIUM. Six species. Chiefly hardy plants. *G. albescens*, an evergreen shrub. *G. purpurium*. The shrubby and herbaceous increase by cuttings and division; the annuals and biennials by seeds. Rich light soil.

GNIDIA. Seventeen species. Green-house and evergreen shrubs. Young shoots planted in sand. Peat soil.

GOAT MOTH. See *Bombyx*.

GOAT'S BEARD. *Spiræa aruncus*.

GOAT'S FOOT. *Oxalis caprina*.

GOAT'S ORIGANUM. *Thymus Tragoriganum*.

GOAT'S RUE. *Galega*.

GOAT'S THORN. *Astragalus Tragacantha*.

GOBBO. See *Artichoke*.

GODETIA. Three species. Hardy annuals. Seeds. Common soil.

GODOYA *geminiflora*. Stove evergreen tree. Ripe cuttings. Peat and loam.

GOLDBACHIA *lævigata*. Hardy annual. Seeds. Common soil.

GOLDEN HAIR. *Chrysocoma comauarea*.

GOLDEN ROD. *Bosea*.

GOLDEN THISTLE. *Scolymus*.

GOLDEN THISTLE. *Protea Scolymus*.

GOLDFUSSIA *anisophylla*. Stove evergreen shrub. *G. glomerata*, stove herbaceous perennial. Cuttings. Loam and peat.

GOLD OF PLEASURE. *Camelina*.

GOLDY LOCKS. *Chrysocoma*.

GOMPHIA. Six species. Stove evergreen shrubs. Cuttings. Sandy loam.

GOMPHOCARPUS. Three species. Green-house evergreen shrubs. Cuttings. Loam and peat.

GOMPHOLOBIUM. Twenty-five species. Chiefly green-house evergreen shrubs. Cuttings. Sandy loam and peat.

GOMPHRENA. Seven species. Stove or green-house annuals and biennials, herbaceous perennials, or evergreen shrubs. Seeds; and the shrubby kinds, cuttings. Rich mould.

GONGORA. Four species. Stove orchids. Division. Wood.

GONOLOBYS. Twenty-one species. Stove evergreen and hardy and green-house deciduous twiners. The hardy require a dry situation, and increase by division or seeds. Peat or any light soil. For the stove and green-house kinds, cuttings. Loam and peat.

GONOSTEMON. Three species. Stove evergreen shrubs. Cuttings. Sandy loam.

GOODENIA. Seven species. Green-house evergreen shrubs, and herbaceous perennials. Seeds or cuttings. Peat and loam.

GOODIA. Three species. Green-house evergreen shrubs. Cuttings or seed. Loam and Peat.

GOOD NIGHT. *Argyria bona nox*.

GOODYERA. Six species. Stove or hardy orchids. The former do best in sandy peat and leaf mould: the latter require sandy peat, and are increased by division.

GOOSEBERRY. *Ribes grossularia*
The European succeed but indifferently in this country, unless it be in the dry atmosphere of a city. Mildew, the especial enemy of this fruit, seizes on it, and speedily arrests the circulation of the juices—the consequence is inevitable disease. It has been said that a solution of whale-oil soap will destroy the parasite, and preserve the fruit healthful and perfect.

Varieties.—If quality be the chief consideration, as most assuredly it ought to be, the following are the best:—

Red Champagne.

Red Turkey.

Keen's seedling, Warrington.

Early White.

Woodward's Whitesmith.

Hebburn.

Green Prolific.

White Fig.

Pigmaston.

Green Gage.

Yellow Champagne.

Taylor's Bright Venus.

Red Warrington.

Rumbullion.

If size be the primary object, the following may be cultivated:—

Reds.

Briton.

Companion.

Conquering Hero.

Guido.

Lion's Provider.

London.

Roaring Lion.

Young Wonderful.

Whites.

Cossack.

Fleur-de-Lis.

Freedom.

Lady Stanley.

Miss Walton.

Philip the First.

Tally-ho.

White Eagle.

Yellows.

Broom Girl.

Bird Lime.

Catherina.

Goldfinder.

Gunner.

Leader.

Pilot.

Teazer.

Two-to-one.

Greens.

Green Prince.

Keepsake.

Overall.

Providence.

Peacock.

Turn-out.

Thumper.

Weathercock.

The size to which some of these have been grown are as follows:—

Roaring Lion	29 dwts.
Teazer	32½ "
Young Wonderful . . .	27½ "
Companion	28 "
London	35 "

To raise Varieties.—The seed must be taken from perfectly ripe berries, and sown immediately in pots of light loam, to remain in the green-house during winter, or be preserved in sand until February, and then sown. The soil must be kept moderately moist until they are large enough to prick out in beds.

Cuttings are the best mode of propagating approved kinds. Take a bearing shoot not less than nine inches long; remove all the buds but the top three, and bury them to within an inch of the lowest bud left. Plant them in rows eighteen inches apart each way.

Culture.—At the end of the first year, the shoots must be cut down to a few eyes, and the plants kept clear from any summer shoots that may be on the stem or that spring from the root; they must have plenty of water the first summer.

They will be fit to plant out in two or three years into borders or quarters, at eight feet between the rows, and six feet apart. At the time of planting out, some rich compost may be added with great effect towards the flavour, size, and abundance of the crop.—*Doyle.*

“There is a continual tendency on the part of the under ground buds to become branches, and these are the suckers that we find so troublesome in many kinds of soils. By continually stopping and wounding them, however, they will in general perish; and to do this is what we recommend.

“The Lancashire gooseberry growers adopt the following as the best means of preventing gooseberries from throwing up suckers, and also an excellent plan of insuring an abundance of large fruit.

“In the sketch, (Fig. 60,) A is the

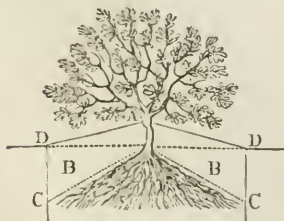
bush, B B is the soil taken out about eighteen inches all round the plant, and about six inches deep at C, that if there are any buds or suckers, they are sure to be seen and destroyed. This do every year in December, and as soon as the soil is taken out, spread cowdung over the roots as shown at B, after which replace the earth that has been taken out: when you have any new seedlings to propagate, do not take out the soil, but lay the manure round them, and cover it with a layer of earth, which encourages the plant to produce suckers.

“By these means good bushes are sooner obtained than by cuttings, and generally speaking, well-rooted suckers may be taken off in October, which produce fruit the following year. The cuttings should be deprived of all their under-ground eyes or buds; before they are put into the ground to take cuttings from twelve to fifteen inches long, cut the upper end to a bud, leaving three or four other buds below it, then pare away all the other buds, and pick out the lowest of all, finishing just below it by a horizontal clean cut.”—*Gard. Chron.*

Pruning in the summer is confined to pinching off superfluous and misplaced shoots, it always being kept in mind that the centre of the tree in standards must be kept open so as to admit the light. “At the time of pruning,” says Mr. Doyle, “some fine young shoots should be left in the most convenient place as bearing wood for the ensuing year, and room must be made for them by cutting out some of the old wood. Each of the old branches should have a leader left of new wood, which may be shortened according to its strength so as to leave five or six inches above the old wood. Very strong shoots need not be so much shortened unless in a part of the bush which is naked, and requires to be furnished.

“Avoid shortening the shoots unless when the tree is naked, or the wood will be crowded, tufted, and productive of very small and indifferent fruit. The leading shoot at the end of each branch should, where it is possible, terminate naturally, if it be not inconsistent with the equable extent of the tree; and in most cases it may still be so contrived by having recourse to the next lateral branch of the desired extent, and by

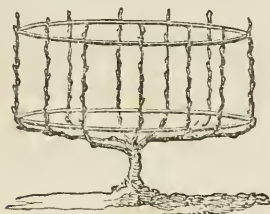
Fig. 60.



taking away that which straggled beyond it. Let it be recollected that at the time when the young trees are growing in the nursery, and at all times after, the attention of the gardener must be directed to what is called "stemming the trees," which is producing and continuing a clear stem to a given height, (according to the growth of the different kinds,) by taking off all lateral shoots at their first appearance.

Espaliers.—No fruit is more benefited than that of the gooseberry, by having the tree trained as an espalier. It is best done to stakes arranged lozenge-wise, (see *Espalier*,) or the bush may be trained round hoops in this form.

Fig. 61.



Fruit.—This should be thinned, the smaller berries be cut away with a pair of scissors for tarts, &c., as required, and the fine berries left for dessert. If some of reds, as the Warrington, and of the thick-skinned yellows, as the Mogul, are matted over when the fruit is ripe, it will remain good until Christmas. This is easiest done when the tree is grown as an espalier. To increase the size of the berries, abundance of water and liquid manure are given to the roots, and the berries are *suckled* by keeping their tips in saucers of water; this is sacrificing the flavour to increase the circumference of the fruit.

Vermin.—The caterpillar and the black-fly are both destroyed by syringing the bushes with water, and then dusting the leaves above and beneath with white hellebore powder, or with lime and soot mixed in equal proportions.

Forcing.—Neither the gooseberry nor currant can be forced without great care. No heat must be applied when they are first put under glass. A very

low temperature, about 60° afterwards, and not higher than 40° at night.

GORDONIA.—Four species. Hardy deciduous shrubs. *G. hamatoxydon* is a stove evergreen tree. *G. pubescens*, (the *Franklinea*) is a highly attractive shrub or minor tree, indigenous to Georgia, &c. Layers or cuttings. Peat and loam.

G OSS Y P I U M. The Cotton Tree. Eleven species. Stove annuals, biennials, perennials, or evergreen shrubs. For the shrubby kinds, cuttings and seeds. The annuals and biennials, seeds. A light rich soil and a moist heat.

GOUANIA. Six species. Stove evergreen climbers. Cuttings. Peat and loam.

G O U R D, *Sagenaria vulgaris*, and **PUMPKIN,** *Cucurbita pepo*, are chiefly employed in the making of pies, &c. There are numerous varieties, varying in the shape and colour of their fruit: as the globular, oval, pear-shaped, green, striped, marbled, yellow, &c., &c. One variety, of a pale buff or salmon colour and globular form grows to the weight of one hundred and ten pounds and upwards: it is known in France as the *Potiron Jaune*, and used in soups, but in particular from being mashed and eaten as potatoes or turnips, being of a very pleasant and peculiar flavour. The bottle-shaped is of little use for culinary purposes, but is remarkable as being of the form of a Florence or oil-flask.

Cucurbita melopepo, the Squash. *Cucurbita succada*, the Vegetable Marrow. Both these are cultivated for the fruit, which being gathered when of the size of a goose's egg, is boiled whole in salt and water, laid upon toast, and eaten as asparagus. Of the squash, there are almost as many varieties as of the pompion, and similarly characterized. The young fruit is much used in pickles. They may be sown in a hot-bed of moderate strength, under a frame or hand-glasses at the end of March or early in April. In May they may be sown in the open ground, beneath a south fence, to remain, or in a hot-bed, if at its commencement, to forward the plants for transplanting at its close, or early in June. The plants are fit for transplanting when they have got four rough leaves, or when of about a month's growth. They must be plant-

ed without any shelter on dunghills, or in holes prepared as directed for the open ground crop of cucumbers. Some may be inserted beneath pales, walls or hedges, to be trained regularly over them on account of their ornamental appearance. They may be treated in every respect like the *cucumber*, only they do not want so much care. They require abundance of water in dry weather. When the runners have extended three feet, they may be pegged down and covered with earth at a joint; this will cause the production of roots, and the longer continuance of the plant in vigour.

The fruit for seed should be selected and treated as directed for the cucumber. It is ripe in the course of September or October.

We have retained this article in its original form as a matter of curiosity, not only as regards the artificial means necessary in Great Britain, for the production of the pumpkin and the squash, but also with reference to the manner in which the latter vegetable is served at table. In the United States no person who cultivates a garden, however small, can be presumed ignorant as to the culture of these vines, and it is therefore unnecessary to add a word of instruction. The pumpkin described as the *Potiron Jaune* is the one known with us as the mammoth, of which specimens have been exhibited before the Pennsylvania Horticultural Society, over eight feet in circumference.

GOVENIA. Four species. Stove orchids. *G. gardneri* an herbaceous perennial. Division. Sandy peat and light loam. *G. lagenophora*, as a swamp plant in very sandy peat. "Having filled a twenty-four with about two inches of crocks, place over them a layer of spongy peat for two or three inches more, and then fill it up with nearly equal quantities of sharp sand and heath mould, so that the surface is nearly all sand. Place it near the light in a cool part of the stove about 60°, and keep it very wet as long as it continues growing. It generally flowers in April or May. Remove to the greenhouse after flowering, and keep quite dry in the stove from October to February."—*Gard. Chron.*

GRAFF or GRAFT. See *Scion*.

GRAFTING is uniting a scion or

part of a branch of one plant upon the root, branch, or stem of another.

Grafting is a difficult mode of multiplying an individual, because it is requisite so to fit the scion to the stock, that some portion of their alburnums and inner barks must coincide, otherwise the requisite circulation of the sap is prevented. No graft will succeed if not immediately grafted upon a nearly kindred stock. I say immediately, because it is possible that by grafting on the most dissimilar species on which it will take, and then moving it with some of the stock attached, to another stock still more remotely allied, that a graft may be made to succeed though supplied with sap from roots of a very dissimilar species. Thus some pear scions can hardly be made to unite with a quince stock; but if they be grafted upon a young shoot and afterwards inserted in a quince stock, they grow as freely as if inserted in a seedling pear stock.

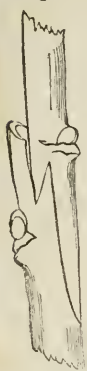
The reason for this unusual difficulty in the way of uniting kindred species, arises from one or more of these causes. First, the sap flowing at discordant periods. Secondly, the proper juices being dissimilar. Or thirdly, the sap vessels being of inappropriate calibre.

Grafting is employed, first, to multiply any desired variety or species; secondly, to accelerate its fruitfulness, as when the shoot of a two year old apple seedling is grafted upon a stock of six years' growth, it will arrive at fruitfulness much sooner than one left on the parent stem; thirdly, to improve the quality of the fruit by having a more abundant supply of sap; and fourthly, to renew the productiveness of stocks from which previous kinds had failed.

The best modes of grafting are thus described by Dr. Lindley in his admirable *Theory of Horticulture*:—"Whip grafting is the commonest kind; it is performed by heading down a stock, then paring one side of it bare for the space of an inch or so, and cutting down obliquely at the upper end of the pared part, towards the pith; the scion is levelled obliquely to a length corresponding with the pared surface of the stock, and an incision is made into it near the upper end of the wound obliquely upwards so as to form a 'tongue,' which is forced into the corresponding wound in the stock; care is then taken

that the bark of the scion is exactly adjusted to that of the stock, and the two are bound firmly together.

Fig. 62.



"Here the mere contact of the two enables the sap flowing upwards through the stock to sustain the life of the scion until the latter can develop its buds, which then send downwards their wood; at the same time the cellular system of the parts in contact unites by granulations, and when the wood descends it passes through the cellular deposit, and holds the whole together.

"The use of 'tongueing' is merely to steady the scion and to prevent its slipping. The advantage of this mode of grafting is the quickness with which it may be performed; the disadvantage is, that the surfaces applied to each other, are much smaller than can be secured by other means.

"It is, however, a great improvement upon the old *crown grafting*, still employed in the rude unskilful practice of some continental gardeners, but expelled from Great Britain; which consists of nothing more than heading down a stock with an exactly horizontal cut, and splitting it through the middle, into which is forced the end of a scion cut into the form of a wedge, when the whole are bound together. In this method the split in the stock can hardly be made to heal without great care; the union between the

Fig. 63.



edges of the scion and those of the stock is very imperfect, because the bark of the former necessarily lies upon the wood of the latter, except just at the sides; and from the impossibility of bringing the two barks in contact, neither the ascending nor descending currents of sap are able freely to intermingle. This plan is much improved by cutting out the stock into the form of a wedge, instead of splitting; it may, however, be advantageously employed for such plants as

Cactaceæ; the parts of which, owing to their succulence, readily form a union with each other.

"A far better method than *whip grafting*, but more tedious, is *saddle grafting*, in which the stock is pared obliquely on both sides till it becomes an inverted wedge, and the scion is slit up the centre, when its sides are pared down till they fit the sides of the stock. In this method the greatest possible quantity of surface is brought into contact, and the parts are mutually so adjusted, that the ascending sap is freely received from the stock by the scion, while at the same time, the descending sap can flow freely from the scion into the stock. Mr. Knight, in describing this mode of operating, has the following observations:

"The graft first begins its efforts to unite itself to the stock just at the period when the formation of a new internal layer of bark commences in the spring, and the fluid which generates this layer of bark, and which also feeds the inserted graft, radiates in every direction from the vicinity of the medulla to the external surface of the alburnum.

"The graft is of course most advantageously placed when it presents the largest surface to receive such fluid, and when the fluid itself is made to deviate least from its natural course. This takes place most efficiently when, (as in this saddle grafting) a graft of nearly equal size with the stock is divided at its base and made to stand astride the stock, and when the two divisions of the graft are pared extremely thin, at and near their lower extremities, so that they may be brought into close contact with the stock (from which but little bark or wood should be pared off) by the ligature."—*Hort. Trans.* 147.

To execute saddle grafting properly, the scion and stock should be of equal size; and where that cannot be, a second method, in which the scion may be much smaller than the stock, has been described by the same great gardener.

This is practised upon small stocks



Fig. 65. almost exclusively in Herefordshire; but it is never attempted till the usual season of grafting is past, and till the bark is readily detached from the alburnum. The head of the stock is then taken off, by a single stroke of the knife, obliquely, so that the incision commences about the width of the diameter of the stock, below the point where the medulla appears in the section, and ends as much above it upon the opposite side. The scion, or graft, which should not exceed in diameter half that of the stock, is then to be divided

longitudinally, about two inches upwards from its lower end, into two unequal divisions, by passing the knife upwards just in contact with one side of the medulla. The stronger division of the graft is then to be pared thin at its lower extremity, and introduced, as in crown grafting, between the bark and wood of the stock; and the more slender division is fitted to the stock upon the opposite side.

"The graft, consequently, stands astride the stock, to which it attaches itself firmly upon each side, and which it covers completely in a single season. Grafts of the apple and pear rarely ever fail in this method of grafting, which may be practised with equal success with young wood in July, as soon as it has become moderately firm and mature."—*Theory of Horticulture*.

The other modes of grafting require no description, but will be best understood by a reference to the following sketches.

Cleft Grafting.

Fig. 66.



Side Grafting.

Fig. 67.



Chink or Shoulder Grafting.

Fig. 68.



Root Grafting.

Fig. 69.



By whatever mode the operation be performed, the essentials for success

are, 1. That the same parts of the stock and scion should be brought into contact as much as possible — bark to bark, and alburnum to alburnum. 2. That as the nourishment has to be afforded to the graft from the alburnum of the stock with which it is brought in contact, this should not be exposed to the air for one minute longer than is necessary to insert the previously prepared graft, for if the surface becomes dry in the slightest degree, vegetation on that part is permanently destroyed; and thirdly, that the air and wet should be excluded after the scion has been inserted, otherwise the dryness of the parts, or the dilution of the sap, will prevent the union. To effect the desired exclusion, the entire wound must be inclosed with grafting clay or grafting wax, the best recipes for which are these:—

Grafting Clay is best made of two parts cow-dung; three parts common clay; and one part awns or beards of barley, kneaded together thoroughly.

Grafting Wax.—Moist bast is usually employed for closing the wound of the stock, but it is far preferable to use worsted, and over this a coating of the grafting wax, made according to the following recipe:—

Burgundy pitch	1 oz.
Common pitch	4
Yellow wax	4
Tallow or lard	2

Peg Grafting, or Te-rebration.

Fig. 70.



Nitre (carbonate of potash, powdered) 1

The same composition spread upon slips of linen makes *Grafting Plaster*, frequently used by amateur budders.

GRAMMANTHES *chloroflora*. Stove annual. Seeds. Loam and lime rubbish.

GRAMMATOPHYLLUM. Twospecies. Stove orchids. Division. Wood.

GRANGERIA *borbonica*. Stove evergreen tree. Cuttings. Peat and loam.

GRAPE-VINE (*Vitis vinifera*). Of this fruit ninety-nine varieties are cultivated in the Chiswick Garden.

Open-wall culture.—*Varieties* best suited for this, according to the experience of Mr. Hoare, are :—

Black Hamburg.

Black Prince.

Esperione.

Black Muscadine.

Miller's Burgundy.

Claret Grape.

Black Frontignan.

Grizzly Frontignan.

White Frontignan.

White Muscadine.

Malmsey Muscadine.

White Sweetwater.

Eighty-six of the varieties have been cultivated at Wilbeck within the last seven years, but only about fourteen found of superior excellence, and many of the others were mere synonyms. Mr. Tillery, from this long course of experience and observation, recommends the following selections :—

"*For the Earliest House*.—The Purple Constantia, or Frontignan; White Frontignan; Black Prince; Dutch, or Stillward's Sweetwater; Black Hamburg; and Tripoli.

"*For Stove*.—White Muscat of Alexandria; Purple Constantia; White Frontignan; Grizzly Frontignan; Black Muscat; and Black Damascus.

"*For Green-house*.—Black Hamburg; Tripoli; Grove-end Sweetwater; and Muscadine.

"*For Latest House*.—West's St. Peter's, and Charlesworth's Tokay.

"*For a Single House* with fourteen rafters.—One Purple Constantia; one White Frontignan; one Royal Muscadine, or Chasselas D'Arboyce; three Muscats; three Black Hamburgs, or Tripolis; three West's St. Peter's; and two Black Princes.

"*For Pot-Culture*, to cover in during April and May.—Purple Constantia and White Frontignan."—*United Gar. Jour.*

Until recently but few houses for the exclusive growth of grapes under glass, had been erected in the United States. The success which attended the effort in the vicinity of Philadelphia, Boston, and other cities, has excited emulation, and at this day (1847) one of the most attractive features of our Horticultural exhibitions, are grapes grown under glass, not exclusively through the agency of fire-heat, but in many instances by the aid of the glass alone.

Propagation.—*Layering* is the most certain and most expeditious mode of propagating the grape-vine. In the first part of March cut away the fourth bud of the shoot to be layered, pass the shoot through the hole in the bottom of garden-pot, fill this with light rich earth, so that the wound of that fourth bud is in the centre of the earth, and two buds above its surface; fix the pot firmly to the wall, so as not to be disturbed; keep the earth *constantly* moist with liquid manure, giving a little every day, and a little moss tied over the surface and round the sides of the pot to check evaporation. Cut away the layer from the parent in the last week of August; and, turning it out from the pot, *without at all disturbing the earth*, plant it where it is to remain, and water it plentifully with liquid manure until the leaves begin to fall.

Cuttings.—At the time of autumn-pruning select some middle-sized, well-ripened shoots, cut off lengths of six buds, keep them in moist sand through the winter, and, at the end of March, cut them in half, remove the two lower buds, and plant them under a wall having an eastern aspect, leaving the upper bud just above the surface, and covering them with a hand-glass. The soil must be light, rich, and well pulverized, pressed close round the cuttings, and *kept constantly moist* with liquid manure until the leaves fall in autumn. The surface round them should be stirred at least twice a week to allow the air unimpeded entrance.

Coiling is only a peculiar mode of propagating by cuttings suggested by Mr. Mearns, whose practice has been epitomised thus by Dr. Lindley :—

"In the propagation of vines by coiling, Mr. Mearns' practice, if single rods

are contemplated, is not to leave them longer than four or five feet, and to remove all the buds but the uppermost. These rootless cuttings are coiled into long narrow pots, being so placed that the bud of the apex of the shoot, although the highest part, is still two inches beneath the surface of the soil; at the same time sufficient room is left beneath the coil for the roots to extend themselves. These cuttings being put in between the middle of January and the end of March, are plunged at once into a hot-bed between 90° and 100°, where they remain until they require more pot-room. They are then shifted, and placed in a suitable situation until again excited in November or December. When the cutting begins to grow, the shoot is trained upright, until it is seven or eight or ten joints long, when the top is pinched off. After this stopping the laterals are displaced as they appear; and if the vines have done well, two or three of the buds will also be excited at the same time, in which case the shoots are cut down to the lowest excited eye. The single shoot is then trained upright and divested of all laterals and tendrils. None of the plants are allowed to grow longer than from four to six feet, at which length the tops are pinched off, the uppermost lateral, which is also stopped at the first joint, being left to carry off the remaining sap.

"At this season the plants are removed to a warm and sheltered situation in the open air; and when the leaves fall they are headed down to one, two, or three joints, according to their strength, and are placed against a northern aspect. When cold weather sets in they are taken back to a sheltered spot, and plunged in the ground to protect the roots, the pots being mulched over, and the rods covered to protect them from frost.

"When these yearling potted vines are brought early into action, it is recommended to bow a piece of wire above the pot with both its ends running down the inside, of sufficient height to allow the whole length of the stem to be attached to it, as represented in the accompanying figure.

"The buds from the stem being thus bent, break more regularly; and when this is effected the vine is united, and secured to an upright stake or sloping

Fig. 71.



trellis. To prevent evaporation the stem is wrapped loosely in moss, which is kept constantly moist until the grapes are set, when it is removed. The plants, up to this period, are encouraged by bottom-heat and shifting; and the quantity of fruit is regulated by the size of the pot and the quality of the vine."—*Gard. Chron.*

Seed.—To raise new varieties seed from the largest, earliest, and best ripened berries must be separated from their pulp, and kept until the February following; then to be sown in "pots filled with light fresh mould, and plunged in a moderately warm hot-bed. They will come up in four or six weeks; and when the plants are about six inches high, they should be transplanted singly into forty-eights, and afterwards into pots of larger size.

"Water gently as circumstances require; allow abundance of light and air, and carefully avoid injuring any of the leaves. Cut down the plants every autumn to good buds, and suffer only one of these to extend itself in the following spring. Shift into larger pots, as occasion requires, till they have produced fruit. This, under good management, will take place in the fourth or fifth year, when the approved sorts should be selected, and the rest destroyed, or used as stocks on which to graft or inarch good sorts."—*Enc. of Gard.*

If a hybrid grape be required, the stamens of the female parent must be cut away with very sharp-pointed scissors before their anthers have burst,

and the pollen be applied to the stigma from the male desired to be the other parent. No very superior varieties have yet rewarded those who have attempted thus to improve the grape.

Budding.—A good authority thus states his mode:—

“About the first week in March I perform the operation: or, as soon as I perceive the sap begin to rise, I cut from a branch, about three inches in length, an eye having attached as much wood as I could possibly get with it; at each end of the eye, I cut off about a quarter of an inch of the upper bark, making the ends quite thin; I next measure off the exact length of the bud, on the base of the vine intended to be budded, and make a nick slanting upward at the upper part, and another slanting downward at the bottom. I then take the piece neatly out, so that the bud may fit nicely in; and by making the nick as stated above, each end of the bud is covered by the bark of the shoot. I bind the buds firmly round with matting, and clay it, taking care, however, that the clay does not cover the eye of the bud: I then tie it round with moss, and keep it constantly damp; and as the sap rises in the vine, the bud begins to swell.

“When the vine commences to push out young shoots, take the top ones off, in order to throw a little more sap into the bud, and as you perceive it getting stronger, take off more young shoots, and so continue until you have taken off all the young shoots. Budding can only be performed where the long-rod system is practised, as in that case you have the power of confining the sap to the bud, which will grow vigorously. As soon as you perceive this, cut the vine down to the bud. Budding has the advantage over grafting, by not leaving an unsightly appearance where the bud was inserted. I always allow the matting to remain on until about the month of September.”

Grafting.—“The best method,” says Dr. Lindley, “of grafting vines is to shorten the branch, or shoot, at the winter pruning to the most eligible place for inserting the graft. The graft should be kept in sufficiently moist soil till the time of performing the operation, and for a week previous in the same temperature as that which the vines to be operated upon are growing.

“When such portions of the latter as are shortened for receiving the grafts have made a bit of shoot, graft as you would other fruit trees, taking care to preserve the shoot at the top in claying, and until the buds on the scion have pushed, then shorten it back. Inarching may be performed any time after the vines have started, so far as to bleed.”

—*Gard. Chron.*

Mr. Knight, the late eminent president of the Horticultural Society, has left this record of his experiments on the same mode of propagation:—“I conceived it probable that the success of the Roman cultivators in grafting their vines might arise from the selection of grafts similar to their cuttings, and the result of the following experiment leads me to believe my conjecture to be well founded. I selected three cuttings of the Black Hamburgh Grape, each having at its base one joint of two years old of wood: these were inserted in, or rather fitted to branches of nearly the same size, but of greater age; and all succeeded most perfectly. The clay which surrounded the base of the grafts was kept constantly moist, and the moisture thus supplied to the graft operated very beneficially, at least, if it was not essential to the success of the operation. A very skilful gardener in my vicinity, to whom I mentioned my intention of trying the foregoing experiment, was completely successful by a somewhat different method. He used grafts similar to mine, but his vine grew under the roof of the hot-house, in which situation he found it difficult to attach such a quantity of clay as would supply the requisite degree of moisture to the graft; and he therefore supported a pot under each graft, upon which he raised the mould in heaps sufficiently high to cover the grafts and supply them with moisture. The grafts which I used consisted of about two inches old wood, and five of annual wood, by which means the junction of the new and old wood, at which point cuttings most readily emit shoots and receive nutriment, was placed close to the head of the stock, and a single bud only was exposed to vegetate.”—*Knight's Papers*.

As the practice is rather precarious, I will add further, the observations of Mr. Braddick:—“I feel confident in stating that healthy vines may be successfully grafted with young wood of

the preceding year's growth, from the time that the shoots of the stocks which the grafts are to be put upon have made four or five eyes, until mid-summer, with every prospect of the grafts growing, and without the least danger of the stocks suffering by bleeding. They may likewise be grafted with shoots of the same summer's growth, worked in the rind of the young wood, from the time that the young bunches of grapes become visible on the stocks till July, out of doors, or till a month later under glass. The operation must not be performed later than the periods here specified, because time is necessary for the young shoots of the graft to become hard and ripen before winter."—*Hort. Soc. Trans.*

Single Eyes, or Buds.—Mr. Appleby gives the following directions for this mode of propagation:—"Take a single bud with about half an inch of wood on each side of it, and insert it in a pot four inches in diameter, filled with light rich soil, covering the bud half an inch, and pressing the earth firmly about it, place the pots in a bark bed, or dung bed covered with saw dust; either of these will do, provided the heat is moderate. It will soon shoot up above the soil and begin to send out roots; water very sparingly, for a time increasing the quantity as it requires it. Air is given on all mild days to make it become stout and of a good colour. As soon as the roots reach the sides of the pots, shift into large pots, which operation may be done thrice during the growing season; it will require a stick to support it, and all the superfluous leaves and tendrils removed; ripen the wood by keeping as dry an atmosphere in the pit or frame as possible during the latter part of the season, endeavouring to effect this without any reduction of temperature, which should average about 70° Fahrenheit. When the wood is sufficiently ripened, keep the plant in a cool house or frame, just protected from frost until the planting season."—*Gard. Chron.*

WALL CULTURE.

Aspect.—The object to be obtained is not only warmth, but shelter from the wind, which is injurious to the vine at all times of its growth. To secure this desideratum, the best aspect is S.E. Even E. by N. is a good aspect. Any

westerly point or even due S., exposes the vine to the strong winds which prevail from the W. and S.W.

Soil.—The best soil is a light, rich, sandy loam, eighteen inches deep, resting on a drainage of twelve inches of bricklayers' rubbish.

Manures.—The richest manures, such as night-soil, blood, bone-dust, and butchers' offal, are most beneficial to vines, and should be added annually to the border in which they grow. During the time of their being in bloom, a slight trench in a circuit three feet from the stem should be opened, and the contents of the house slop pail, soapy water, and urine, be poured into it daily.

Walls, for the grape-vine, need never be higher than eight feet, and the more substantial the better, as they cool slowly in proportion to their thickness. They should be painted annually with a creamy mixture of one part lime and two parts soot, to fill up the nail holes, the harbours of insects, to destroy moss, and to increase the warmth of the wall. Although a dark-coloured body radiates heat, and consequently cools more quickly than a similar body of a light colour, yet this is prevented if a proper screen is placed before it. (See *Shelters*.) A coping should project from the top of the wall four inches wide, if this be four feet high, and an additional inch for every foot of height.

Pruning and Training.—The vine bears on wood one year old *only*, and this knowledge must control these operations, for after a branch has borne it is of no further use; and in pruning, a chief object consequently, is to get rid of all the old wood that can be spared. As Mr. Clement Hoarse's practice is founded upon this, I adopt his rules without any modification. He obtains, he says:—"All the fruit of a vine from a few shoots trained at full length, instead of from a great number of spurs or short shoots. To provide these shoots the former bearers are cut down to very short spurs at the autumnal pruning, and at the same time a sufficient number of shoots are left at whole length to produce fruit in the following year; at the succeeding autumn these latter are cut down to very short spurs, and the long shoots that have pushed from the spurs are trained at whole length as before, and so on annually in alternate

succession. This method recommends itself by its simplicity, by the old wood of the vine being annually got rid of, by the small number of wounds inflicted in the pruning, by the clean and handsome appearance of the vine, and by the great ease with which it is managed, in consequence of its occupying but a small portion of the wall.

"1st. In pruning, always cut upwards, and in a sloping direction.

"2d. Always leave an inch of blank wood beyond the terminal bud, and let the cut be on the opposite side of the bud.

"3d. Prune so as to leave as few wounds as possible, and let the surface of every cut be perfectly smooth.

"4th. In cutting out an old branch, prune it even with the parent limb, that the wound may quickly heal.

"5th. Prune so as to obtain the quantity of fruit desired on the smallest number of shoots possible.

"6th. Never prune in frosty weather, nor when a frost is expected.

"7th. Never prune in the months of March, April, or May. Pruning in either of these months causes bleeding, and occasions thereby a wasteful and an injurious expenditure of sap.

"8th. Let the general autumnal pruning take place as soon after the 1st of October as the gathering of the fruit will permit.

"Lastly, use a pruning-knife of the best description, and let it be, if possible, as sharp as a razor."—*Hoare on the Vine*.

In the *spring next after the planting*, two buds only having been left, remove the one which shoots the most weakly,

Fig. 72.



that one selected to remain as often as they appear. Nail the shoot to the wall as often as it extends six inches beyond the previous shred. In November cut the vine so as to leave only two buds. In the *second* spring manage as before, and in the November cut down to three buds; the vine will

then appear thus: Fig. 72.

The *third* spring retain two shoots, treating as before. In September pinch off their tops, and in November prune them so as to retain some buds.

The *fourth* spring in February remove the 1, 2, 4, 5, and 6 buds, bending the shoots down horizontally thus:

Fig. 73.



and training the shoots from buds 3 and 7 as there represented. Prune and train as before directed during the summer, removing also superfluous shoots, and in November cut back *a* and *c* to about eight or twelve buds according to the strength of the vine; and *b* and *d* so as to leave only one bud on each. In the *fifth* spring train the shoots from these single buds in the same waving form as before.

"The vine," says Mr. Hoare, to whose valuable work I am indebted for most of the preceding directions, "has now assumed the form which it is permanently to retain, and the manner in which it is trained may be considered as the commencement of a system of alternately fruiting two shoots, and training two at full length for bearing wood in the following year; which method may be continued every year without any alteration until the capacity of the vine is equal to the maturation of more fruit than can possibly be borne by two single shoots, which, on an average, may be estimated at sixty pounds weight annually. Several years must elapse before this will be the case; but when it is, the arms may be easily lengthened by the training in of a shoot at their extremities, and managing it in the same manner as when the arms of the vine first formed. It is very advisable, however, that the vine should not be suffered to extend itself further on the wall, for in such case, the bearing shoots emitted from the centre are sure to decline in strength; whereas, by confining the dimensions of the vine to a single arm on each side of the stem, and each arm to the support and nourishment of two branches only, the very best description of bearing shoots will never fail to be generated close at home,

and these, as the vine advances in age, will become prolific almost beyond conception. I have often ripened as many as seven full sized bunches of grapes on two shoots which have pushed from a single bud, on vines managed in this manner. Indeed, those who have been accustomed to permit their vines to cover a large space of walling, and to possess a great number of branches, can scarcely imagine how much easier a vine is managed, and with what certainty the fruit is increased in quantity, and improved in quality."—*Hoare on the Vine*.

Thinning.—When the vine has become fruitful, in August, it must have the berries of each branch thinned until not more than half their original number remain. It is best done with a sharp-pointed pair of scissors, and care being taken to remove the smallest berries. This increases the weight and excellence of the bunches, for two berries will always outweigh four grown on the same branchlet of a bunch, besides being far handsomer, and having more juice as compared with husks. The average weight of the bunches on a vine may be taken, when ripe, at half a pound each, and with this data it is easy to carry into practice Mr. Clement Hoare's excellent rule for proportioning the crop to the size of the vine. If its stem, measured just above the ground, be three inches in circumference, it may bear 5 lbs. weight of grapes.

3½ inches	10 lbs.
4 "	15
4½ "	20
5 "	25

And so five pounds additional for every half inch of increased circumference.

VINES IN GREEN-HOUSE.

Training here must be the same as in the hot-house, and the points besides to be attended to are:—

"1. To train the vines to the rafters, or otherwise, so that they shall not overshadow the interior before the end of May. 2. To empty the green-house of all green-house plants after that period, and to take every possible pains to get the wood ripe; you cannot have grapes without well-ripened wood. If vines are very late in growing, they will require fire-heat in autumn, in order to ripen their wood, in many

seasons. Vines and green-house plants do not agree very well; but under such a system they may be kept from quarrelling much."—*Gard. Chron.*

VINES IN HOT-HOUSE.

Varieties.—The proportions the different vines should bear to each other, in order to secure the best succession and a constant supply, are three Black Hamburgh's; two White Muscats of Alexandria; one White and one Black Frontignan; one Black Prince, and one Black St. Peter's.

Construction of Vinery.—For the general principles applicable to the construction of this and all other hot-houses, see the titles *Store*, *Trellis*, &c.

Borders.—These may be formed eight feet broad, of a soil similar to that recommended for the open wall vines, with the same attention to manuring and drainage.

Planting and Pruning.—The practice of Mr. Mearns in this particular is very good:—

"The vines are planted inside the house at two feet and a half apart, nearly close to the front wall, and are headed down to within a foot of the soil. One shoot only is allowed to proceed from each plant, which at the end of the first season is cut down to the second or third eye. Next year two leading shoots are encouraged, the strongest of which is stopped when it has grown three or four joints beyond the middle of the roof, and the weaker, after having grown three or four feet, for the purpose of strengthening the eyes. At the fall of the leaf, the leading shoots are reduced, the main one to the length of the middle of the roof, and the lower one to the third eye. In the third season, one leading shoot is trained in from each shoot, and from the leading shoot fruit-bearing side shoots are produced. One bunch is left on each, and the shoot stopped at one or two joints above it. No side shoots are allowed to proceed from the spur, the leading shoot from which is to become the bearing wood for the next year. Thus, in the autumn of the third season the lower part of the house is furnished with a crop of grapes from shoots proceeding from wood of the preceding year, and parallel to this bearing shoot on each vine is the young shoot for the next year's crop.

"In winter, the shoot from the extremity of the bearing branch is cut off at the top of the roof, or within twelve or fifteen inches of it, and the shoot from the spur is cut down to the middle of the roof, and all the spurs which had borne the grapes are now cut out. Each vine is now furnished with two shoots of bearing wood, a part of old barren wood, and a spur for producing a young shoot the following year. In the fourth summer a full crop is produced, both in the upper and lower half of the house. The longer shoot bearing on the upper half of its length, and the shorter on its whole length; a leading shoot is produced from the short shoot, and another from the spur.

"In the pruning season of the fourth year, the centre shoot is entirely removed, and replaced by the side shoot, now the whole length of the roof, and this side shoot is in its turn supplanted by the shoot from the spur, while a spur is prepared to succeed it.

"*Summer Pruning.* — Mr. Mearns gives the following directions:—"Stop the bearing branches at the bunch, instead of the next joint above it, which is the usual practice; for I found that the fruit did equally well, and it divested the branch of an incumbrance, while it allowed a much larger portion of light to come into the house, together with a more free circulation of air among the fruit and young wood. I blind all the eyes on each fruit spur as soon as they push above a joint or two, before I pinch them back, always cautiously retaining one eye; and am particularly cautious that nothing should happen to injure the leaf that accompanies the bunch, for if that is lost, the fruit of course will come to nothing."—*Hort. Soc. Trans.*

Forcing. — This is sometimes commenced in September, but the close of the next month is sufficiently early. Mr. Appleby, of Macclesfield, gives the following very full and excellent directions:—"In places where there are a number of houses devoted to the vine, it is possible to have ripe grapes all the year round. To accomplish this completely, six houses are necessary, though it may in some degree be done with three. In the former case, the first house ought to be started at the end of October, the second on the first of December, and so on, the first day

of every month till April. Where there are but three houses, it will be early enough to commence the first house in November, the second in February, and the third in April. To cause the vines to break equally all the length of the shoot, tie them down to the front windows, until the buds are all expanded, that one part of it may not be more excited than another.

"When every bud has pushed, carefully separate the vines one by one; and as it is convenient, regulate the shoots, stop them, and thin the number of branches, and do all that is required. Then tie them up loosely to the rafters; and should they hang down a foot from the glass, it is an advantage, especially during the early part of the season."

Syringing and Steaming.—"During the time of forcing the vine (unless they are in blossom) and the ripening of the fruit, syringe them freely with rain-water, morning and evening, all over; also steam the houses by pouring water on the pipes or flues, to keep up a moisture in the air. It is beneficial to the growth of the plant, swells the berries, and keeps down the red spider. While the vines are in blossom, refrain from syringing, but use the steam freely.

"When the berries begin to colour, also cease syringing; but use the steam a fortnight longer, though only at night. As soon as the grapes are nearly ripe, keep as dry an atmosphere as possible, both to give the fruit a good flavour, and to ripen the wood."

Covering the Border.—"This in the early part of the forcing season is absolutely necessary, using either light horse-litter, or fresh-gathered leaves. No frost must be allowed to reach the stems or roots; if it does, the vines will droop when the sun shines, and the bunches will be crippled, and perhaps never come out properly. A tarpaulin is useful to cover the litter and dung, to keep off the heavy rains and snow."

Temperature.—"Commence forcing the vine with a low temperature. The first week keep up the heat to 50°, the second to 60°, the third to 65°, and the fourth to 70°. Night temperature about 10° lower. A good rule is 60° for vines in leaf, and 70° when blooming and ripening fruit; the night temperature may then be 20° lower."

Setting the Fruit.—"To effect the

setting of the fruit, and more especially in the earlier part of the forcing season, use a camel-hair pencil to disperse the pollen on the stigmas. Some kinds of grapes have very little pollen, while others have plenty to spare. In this case take a sheet of white paper, and hold it under the bunch that has abundance of pollen, gently shake the bunch, and then with the camel-hair pencil apply the pollen to such kinds as are deficient."

Thinning the Berries.—As soon as the berries are set and begin to swell, it is time to thin them. For this operation there are proper scissors, with long handles and short blades. Provided with these, some good soft matting, and with something to catch the berries in, (which make excellent vinegar or tarts, &c.), commence the operation by tying up the shoulders of such bunches as require it, to the wires on each side of the rafter; or, if the bunches are very large, fasten some thin narrow lath to the rafter, to tie the shoulders to.

Some persons use a thin piece of lath notched at each end, to prop the shoulders off from the main body of the bunch; but I do not like this plan so well as the matting, the props being apt to drop out.

In order to have large berries, thin very freely, so much so, that the bunches look like skeletons. Of course thin according to the kind; some sorts under the best management do not swell to such a size as others; hence it is necessary to know the medium size to which every variety will swell, and thin accordingly.

Watering the Roots.—Use manure water alternately with clear water. If the border be well watered once a week, it is sufficient. Remember to place boards to walk on, and as soon as the water has sunk in, and the surface becomes rather dry, go over it with a Dutch hoe and rough rake; the more frequently it is stirred the less water it will take; if, however, it is so smooth as to let the water run off, instead of sinking in, point the surface over with a fork and leave it rough.

Covering the Vines in Winter.—“When the vines are not covered with glass in consequence of other fruits being grown in the house, protect them from severe frost; hay-bands may be used, and long straight wheat straw;

the tarpaulin is the best, as it keeps them dry, and of course renders them more able to endure frost.” — *Gard. Chron.*

Vines in Pots.—The first week in February is the best time for planting the cuttings of vines in pots, to remain in cultivation in them. If intended to be fruited next season, plant the cuttings in thirty-twos, selecting well-ripened shoots, with only one plump bud; and cutting the shoot at each end down to about one inch and a half of the bud. Bury this bud in the earth, composed of equal parts of fresh light turfy soil and decayed leaves. Plunge in a bottom heat of 90°; temperature of frame 60° to 90°. In April, shift to the fruiting pots, twos or fours, according to the strength of plant desired. Soil, two parts light turfy loam, and one part old night-soil. Temperature, 60° to 80°. Place the pots so near the roof, that the shoots may be at once trained near the glass as they advance. Best length for the shoots, from four to six feet, though they will bear even ten feet; therefore stop each when a foot longer than required for next season. Manure water must be employed to sustain the growth of the vines, and every means adopted to ripen the wood. Early in September, the pots may be placed out of doors, on the north side of a wall, and laid on their sides, to hasten the vines into a state of rest. In November, they may be returned under glass, and forcing commenced to ripen a crop by the end of March. If strong, and grown in No. 2 pots, seven bunches may be left upon a Ham-burgh, eight upon a Muscadine, but upon weaker plants only about half those numbers.

Mr. W. Stothard, gardener at Chantrey House, in 1841, gives these directions:—“When the vines that are let into the house have reached the top of the rafters, instead of stopping the leading shoot, as is commonly done, and often too soon, which causes the eyes to burst, and renders them useless for the succeeding year, turn the shoot back, and having ready a pot of suitable size, well drained and filled with fresh turfy loam and rotted dung, of equal parts, place it upon the back shelf or wall of the pit, and as soon as the young shoot has attained a sufficient length to be laid into the pot, cut out two or three

eyes, and as many of its leaves, and scrape off a little of the bark the whole length of the part intended for roots, which is bent into the pot, and covered with mould to the depth of six or seven inches. No attention is required, excepting to train the shoot as it advances in growth, and keep the mould in the pot a little moist, to encourage the emission of roots, which will appear in a fortnight or three weeks, and soon fill the pot. When the shoot is laid in the pot, allow it to grow from four to eight feet long, according to the strength of the parent vine, to which leave it attached until it has done growing, and perfectly ripened its wood.

"Should there not be a sufficient quantity of leaders, place pots under the rafters at most convenient situations, and likewise on the front flue; but the shoots that are laid in these pots never suffer to exceed five feet in length. When the plants are severed from the parent vines, put them out under a wall, where they are protected from frosts, and take into the house as required for forcing; at that time shift into pots about a foot over and fourteen inches deep, to remain until the fruit is cut, after which they may be thrown away, sure of a fresh supply of plants every year by the same process." — *Gard. Chron.*

Mr. H. Burn, gardener of Tottenham Park, gives the following particulars of his mode of cultivating the vine in pots:—"I invariably set the eyes in thumb pots on the first of February, and putting moss about two and a half inches deep on the flue at the back of the pine pits, I place the pot upon it, keeping the moss always moist.

"As soon as the bud or eye has grown and become well furnished with roots, I repot into sixty-sized pots, and continue afterwards to shift as fast as the pots become filled with roots; from sixties to forty-eights, thirty-twos, twenty-fours, sixteens, and twelve-sized pots successively; and lastly, into bushel-pots, which I have made for the purpose. I encourage rapidity of growth as much as possible, by feeding them with liquid manure made from cows' and deers' dung; and during the whole time keep a good drainage at the bottom of the pots. The soil I used is nothing more than three-fourths strong turfy loam, and one-fourth horse-dung; from the

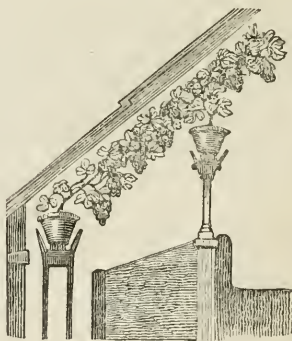
linings of the pine pits select the most decayed parts of the manure.

"I usually allow the shoots to run to the extent of thirteen eyes, and then stop them.

"By the middle of September the wood becomes ripened, and I then prune them back to the ninth eye, and remove them from the pinery to the open air, setting them under a south wall, on bricks placed edgewise, so as to admit free drainage. On the first of November, I generally take in fifty-pots for forcing; (this I have occasionally done on the first of October;) when they are washed with soft soap and sulphur.

"After all the eyes have shown fruit, I select from six to eight of the best bunches to remain, and pluck off the others, never allowing one eye to bear more than one bunch. I syringe the vines gently with warm water three times a week, and water them twice a week with the liquid manure. Should they, however, occasionally require more moisture, I give them nothing more than soft water about milk warm. I invariably fruit annually from 100 to 120 vines, taking in after the first fifty the rest in succession.

Fig. 74.



"The above engraving represents a transverse section of the vinery, with bed for tree leaves to decay and heat; frame-work for the support of front trough sixteen inches wide at the top, and ten inches deep, and the wire under the rafters on which the vines are trained." — *United Gard. and Land Steward's Journ.*

Vines in Frames.—We have the following information on this mode of culture:—"It is well adapted for gardens where the quantity of glass is limited, and is practised by Mr. Dawson, gardener to Lord Ducie, at the Hoo, Hertfordshire. About the first week in April, a bed of partly decayed dung, to which a small quantity of raw material is added, so as to produce a slight heat, is made at about eighteen inches from the wall in front of the selected vines.

"This bed is built sufficiently deep to admit of its being about three feet high, after settling. The frame used by Mr. Dawson separates into two portions, so that the lower part can be first placed upon the bed. It contains a trellis upon which the vines are trained, fixed about a foot above the surface of the dung. The upper portion of the frame can be afterwards put on and secured to the lower by small brackets. The advantage of having the frames constructed in this way is the ease and safety with which the vine can be taken in; since, in introducing the shoots of a vine through a hole cut in the back of a frame of ordinary construction, the buds would be liable to be rubbed off. No more care is required, except in stopping, thinning, &c. Air is given freely, but no linings to the bed are required. In severe weather a covering is put on, but this is not generally resorted to. By pursuing the above method, fruit of good quality has been cut by the latter end of August, for which Mr. Dawson has obtained several prizes at local horticultural exhibitions."—*Gard. Chron.*

DISEASES.

Shanking is a moist gangrene, attacking and destroying the stalk of the grapes, arising apparently from the temperature of the soil being unsuitably below that in which the branches are vegetating.

Warts on Leaves.—Dr. Lindley says, "The appearance of warts on their under side, is most probably caused by damp atmosphere and rich soil, and may be conceived to arise thus: the water which the leaves derive from the stem, and absorb from the atmosphere, is unable to escape again, in consequence of the air that surrounds them being continually loaded with moisture; the result of this is, that the water ac-

cumulates in the interior of the leaves, and swells them up in the form of warts. The presence of the latter on the under side only, is owing to perspiration from the vines, taking place principally by that surface, which is, moreover, much softer and looser in texture than the upper surface."—*Gard. Chron.*

Rust.—The rust of the vine is a disease which attacks the grapes, covering them with a tough brown skin, which is incapable of natural extension, and which stops their growth. Wherever the disease appears, the crop is injured or even ruined. Various causes have been suggested as the origin of this disease; but the true origin I believe to be a sudden unhealthy reduction of temperature whilst the grapes are young. From one frosty night I have seen the fruit of apple trees infected with a very similar induration of the skin.

Bleeding.—If pruned late in the spring the vine is very liable to bleed at this season. A red hot iron applied to the wound until it is partially charred will stop the effusion of sap for a time, and to render the cure permanent, the place should be well rubbed and coated with a paste made of newly burnt lime and grease. This hardens and forms an effective plaster.

Shrivelling arises in the berries from a want of sap. It is caused by several modes of bad cultivation, as excess of wet and cold to the roots; over-heating and subsequent reduction of temperature in the house; and by thinning the leaves erroneously.

Insects infesting the Vine.—See *Scale*, *Thrips*, *Wasp*, &c.

GRAPE HYACINTH. *Muscari*.

GRAPE PEAR. *Amelanchier Botryapium*.

GRASS MOTH. See *Charæas*.

GRASS-PLOT, correctly speaking, is a parterre, or beds of flowers, arranged with grass-turf between them, instead of gravel. It is usually confounded with *Lawn*, which see.

GRASS RAKE. See *Lawn Rake*.

GRATIOLA. Six species. Hardy or green-house herbaceous perennials. Division. Rich moist soil.

GRAVEL WALKS, like all other *Walks*, (*vide*), require a good substratum of drainage, and the facing of about five inches deep of gravel. It must have no stones mixed with it larger than good-

sized marbles, and about one-fourth of it must be much smaller. If a portion of clay is by nature or art incorporated with the gravel, it will bind more firmly, and present when rolled a more compact and even surface.

The following is an excellent plan to make or turn gravel walks in dry weather. If of a sandy or gravelly nature strew a little clay or marl upon the walks. When turned over take away all large stones, and place them at the bottom of the mass. Immediately after you have levelled the walk apply the roller, and let an assistant follow, pouring upon it water from a watering pot with coarse rose; in twenty-four hours after, if the weather is dry, it will be as solid as a stone floor. The writer has had ocular demonstration of the fact in twenty instances in the driest weather.—*Gard. Chron.*

The best method of extirpating grass which springs up from beneath a gravel walk and spreads over its surface, is to break up the walk, and pick out carefully all the under-ground runners which may be met with. Where it is not desirable to disturb the walk, the best way is to spread salt in considerable quantities over its whole surface; and if after the first application it is found that portions of the grass still exist, let another coating of salt be applied, which will effectually destroy it. Care must be taken, however, if the walk is edged with box, that the salt does not come in contact with it, otherwise it will destroy the edging also.

“In the early part of April, gravel walks are usually turned; and practice has taught that there is a right as well as a wrong way, even for the performance of this simple operation. After the walk has been broken up and levelled, and a facing of new gravel spread over, this ought to be left for three or four days, and until a shower of rain has fallen, before the roller is used. This bleaches the gravel, and washes down the fine particles, so that, immediately after rolling, the walk is solid, and has a clean bright surface.”—*Gard. Chron.*

Dr. Lindley has proposed a substitute for gravel in the construction of walks, which will get rid of most of the annoyances attendant upon gravel; for, formed of this material, they will never be troubled by worms or weeds,

and will never require rolling. They may be made of the same arched form; and if, at the time of making, the surface be sprinkled with fine bright coloured gravel, they will be as handsome as if formed entirely of that material.

The composition recommended must be made and laid down in perfectly dry weather.

“Procure a quantity of road-sand, or similar powdery material—finely sifted lime-rubbish will do—and let it be thoroughly dried, so that it feels like dust when handled: also sift out of the cinders from the dwelling-house, &c., the finer parts, and let these be also made perfectly dry; mix these carefully, two parts road-sand to one of ashes. In a dry place, on a dry day, spread a quantity of the mixture, as a bricklayer spreads his lime, with a hollow in the middle. Into this hollow pour some coal-tar, boiling hot. Incorporate the whole with a shovel, as if making mortar, and when a thick paste, spread it three or four inches thick over the ground, laid out for the walk or floor. The ground should previously be beaten down as firm and as level as possible. Powder it all over with dry and rather coarse sand, after which a few passages of the roller will press it level. Leave it for a few days to harden, after which the walk is fit for use, and will last for very many years.”—*Gard. Chron.*

GREAT BURNET. *Sanguisorba*.

GREAT CENTAUREA. *Centaurea centaurium*.

GREEN-HOUSE. This is a winter-residence for plants that cannot endure the cold of our winter, yet do not require either the high temperature or moist atmosphere of a stove [*i. e.* hot-house].

“The first thing to be attended to in its construction,” says Mr. H. Fortune, of the Chiswick Gardens, “is the choice of a proper situation. South is the best aspect, or as nearly that as possible: south-west or south-east will do, or even east or west; but on no account should it ever face the north. Green-houses should be fixed in situations where they will not be shaded from the sun by any part of the dwelling-house, or other buildings, and should also be quite free from large trees. They should not be placed near trees for another reason than being shaded by them, namely, the glass in the roof being apt to be

broken by the rotten branches which are sent down during high winds.

"Another most desirable consideration is, to make arrangements for a constant supply of rain-water. This is very easily done when the house is building. Gutters are wanted to carry the wet off the roof; and, in so doing, let it be brought into a tank in the house, and used for watering the plants. Slate-tanks may be used for this purpose, or they may be built of brick and cemented over on the inside. This will be economy in the end; and the water collected in this way is much to be preferred to many kinds obtained from springs.

"A drain should be made to enable the tank to be emptied at pleasure, and into which the water used in washing out the house can be swept, without running into the tank."—*Gard. Chron.*

The following is the plan of a greenhouse erected at Yester, the seat of the Marquis of Tweeddale, and which answers perfectly.

"In ordinary severe weather, while the thermometer, in the open air during night, ranges between 20° and 30° , no difficulty is found in keeping the temperature to any point required between 50° and 80° , which is quite sufficient. The stove is heated with coke; and during a period while the thermometer ranged between 60° and 76° , the cost did not exceed 2s. 6d. per month. The fuel consumed during the time was ten bushels. We do not know what is the principle of the stove, but it resembles an Arnott, and stands within the house, which is twenty-five feet long, twelve feet broad, and thirteen feet high.

"*a a*, back wall; *b b*, mouths of cold air stove; *d*; *e e*, a few descending steps by which it is supplied from the outside with fuel, through an opening in the wall, as shown in the plan. On the same level there is a place, *f*, for containing coke, as represented by the dotted lines; *g g* is a brick casing,

formed in lengths of two feet each, and neatly joined together; they are open at top, and have movable covers. Into this casing the heated air from the stove is first received, and afterwards distributed at pleasure. In addition to the heat given off in this way, the brick casing, from retaining the hot air, together with the flue-pipe passing through it, becomes so hot as to give off a large quantity in a radiating form.

"In the figure, two of the flue covers are removed to show the surface of the iron water-troughs, fitted on the flue-pipe, and resting on the bottom of the brick-casing, better seen in the sectional view. The troughs are only filled with the heated air when it is wanted in a humid condition; in other cases the humidity from the cistern *h*, which supplies water for the ordinary purposes of the house, will be sufficient; *i* and *j* are wood wedges inserted on one side of the covers to raise them, more or less, in proportion to the quantity of heat required: *k* is the termination of the flue-pipe, where it ascends, crossing the house above the door, and entering the back wall into the chimney. When the house is to be heated, it is only necessary to light the fire in the stove *d*, and open one of the cold air-drains *b c*, as in the present instance the internal one, *b*, is open. The arrows represent the cold air flowing towards the stove, where it enters below, and after traversing a numerous formation of winding channels in a heated state, discharges itself into the brick-casing, *g g*, above the flue-pipe, from which it escapes as heretofore mentioned.

"When the cold air is taken from the external drain, *c*, the internal one, *b*, is closed; a regulation, however, which is entirely at the discretion of the superintendent of the house: *r*, the regulator in the ash-pit of the stove, the handle of which is turned so as to admit a greater or less quantity of air, by which the combustion of fuel in the stove is regulated: *s s* and *m m*, ventilating grates; *n n*, rods of iron suspended to the frames of the top windows to open and shut them; *g*, a system of small rods for conveying the drip from the inside of the roof to the cistern, *h*; *p*, cover of stove-pit: it is hinged, and readily thrown back when admission to the stove is wanted.

"For ordinary-sized plant or fruit-

Fig. 75.

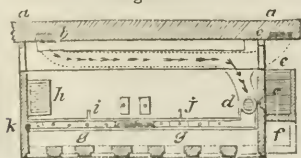
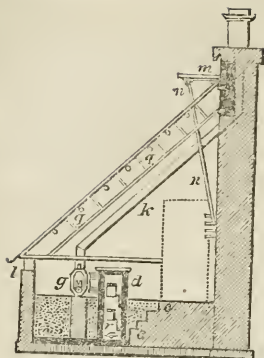


Fig. 76.



houses, the above method of heating will be found quite sufficient. Where very large structures are required to be heated, any additional quantity may be procured by means of hot water-pipes supplied from a boiler placed within the patent stove. The pipes may be conveyed in a different direction from the hot-air flue. The boiler, although heated with the stove-furnace, requires no additional fuel."—*Gard. Chron.*

On a larger scale is the green-house at Kew; but as the same principles and arrangements may be adopted on a smaller scale, I give the following extracts from the details published by Dr. Lindley:—

"The general arrangement is excellent. None of the door-ways are placed in direct continuation of the walls; but they are either formed immediately opposite the principal masses of plants, or obliquely with respect to the walks; so that the eye necessarily rests upon the foliage as soon as the house is entered.

"Then, again, at the point where the houses join each other, a semicircular stage is thrown forward, by which the disagreeable effect of a long narrow walk, in a small house, is completely removed.

"The house is span-roofed, and illustrates the great advantage of this kind of construction over the wretched lean-tos, which were formerly in fashion. We need not say that one of the advantages of a span-roofed house is, that plants are exposed to light in all directions: but, all-important as is that pro-

perty, it by no means forms the only valuable feature in them. Plants can be easily reached and easily removed; the appearance of the interior is very much improved, and no space is wasted. In a common glass shed, at least one half is useless—that is to say, the whole of that part which is next the back wall. Here, on the contrary, every portion of the interior, except the walks, is rendered available.

"The construction of the roof is excellent. It rises at an angle of 30° , which is exactly that best suited for houses of such a description; the rafters are very light, and of a better form than any we have previously seen. We will not pretend to say why they produce so good an effect; for words will never convey an adequate idea of the cause of the beauty of such objects. Perhaps it is their lightness; probably it is the two combined. Lightness of appearance has been combined with strength by the addition of an iron rod to the lower edge of the rafter, in the place of a head.

"In order to strengthen the roof and to provide for the cultivation of climbers, all the rafters are connected by means of curved iron rods, which themselves add much to the beautiful appearance of the interior. This mode of combining strength and decoration may of course be varied, but it will not be improved.

"Another important thing in the arrangements is the ample provision for receiving in tanks the rain-water that falls on the roof of the building: this is raised for use by means of small hand-pumps.

"It must be apparent that such a house as this is precisely what is most generally wanted by those who build green-houses. If a large space is required, it is easy to lengthen any of the arms; if more variety is desired, another cross house could be readily added to the smaller one. Should it be too large, as will more frequently be the case, the smaller arm may be copied or the larger, as the case may be. If a stove is wanted instead of a green-house, it would only be necessary to inclose the stages, to put hot water troughs into the chamber so obtained, and to add evaporating-pans to the pipes which are carried round the walls.

"In short, it appears to us that in

this one house are contained illustrations of all the more important objects which are in the majority of cases to be attained in green-house building.

"It should be added, that the upright sides of the house are glazed with panes of sheet-glass, in one length; and that each of the roof sashes has but two panes in its length; this no doubt adds very much to its beautiful appearance."—*Gard. Chron.*

The plan given of the green-house at Yester is a lean-to, but the same system of heating is adaptable to a span-roofed house. This form is to be preferred on many accounts. Thus, as the practice is most injurious to have the temperature of the hot-house too elevated during the night, so no less injurious, in winter, is it to permit tender plants in the green-house or elsewhere, which may have been subjected to a freezing temperature, to be suddenly exposed to a higher degree of heat. Experience has placed it beyond dispute that such plants should be shaded from the sun, and thus returned very slowly to a more genial temperature. So convinced by experiment of the importance of securing plants in green-houses from sudden transitions is Mr. Macnab, the curator of the Caledonian Horticultural Society's garden, that he has those structures ranging north and south, and consequently with a western and eastern aspect. They have two aspects, because he has them with span roofs, instead of the old lean-to form. For green-houses, but not for forcing, there is no doubt that this form is to be preferred; and Mr. Macnab thus enumerates its advantages: "In a span-roofed house the circulation of air may be constantly kept up so as effectually to prevent damp. For such a green-house fire heat is scarcely at all required; for, if there be a free circulation of air during the autumn and winter months, and if the tables and shelves be carefully kept dry and clean, water being sparingly given to such plants only as require it, cold, even descending to freezing occasionally the surface of the soil, will do less injury than the application of fire heat to most plants. In the case of plants frozen in a lean-to house, and others in a span-roofed house extending north and south, the consequences were much the least injurious in the latter, for in it the influence of the sun was much less felt;

as he proceeded towards the meridian, the astragals and rafters formed a shade, and air being given, the plants survived and soon recovered; in the lean-to house they blackened and perished."

GREEN-HOUSE PLANTS.

DWARFS SUITABLE FOR BEDDING IN THE HOUSE.

Acacia armata.
Chorozema varium.
Sollya heterophylla.
Templetonia glauca.
Pultenea daphnoides.
Statice arborea.
Pimelea decussata.
Oxylobium retusum.
Loddigesia oxalidifolia.
Epacris grandiflora.
 ——— *impressa.*
Corræa speciosa.
Euchilus obcordatum.
Hovea Celsi.
Chironia frutescens.
Diosma rubra.
Eutaxia myrtifolia.
Eriostemon buxifolium.
Dillwynia floribunda.
Boronia denticulata.
Genista canariensis.
Polygala oppositifolia.
Coleonema tenuifolia.
Lambertia formosa.

CLIMBERS FOR THE BACK WALL.

Clematis azurea grandiflora.
 ——— *Sieboldi.*
Cobæa scandens.
Maurandya Barclayana.
Kennedyæ Mætryaltæ.

SELECT PLANTS FOR THE SHELVES.

Boronia pinnata, serrulata, and anemonefolia.
Polygala oppositifolia and cordifolia.
Gardoquia Hookeri.
Roelia ciliata.
Hovea celsi and pungens.
Chorozema varium, Dicksoni, and Henchmanni.
Mirbelia floribunda.
Aphelexis humilus.
Pimelea spectabilis, decussata, and hispida.
Bossia linophylla.
Eutaxia myrtifolia.
Dillwynia floribunda.
Luculia gratissima.
Leschenaultia formosa and biloba.
Coleonema tenuifolia.

Genista canariensis.
Sprengelia incarnata and *Croweasaligna*,
 together with the different kinds of
Acacia.
Corræa.
Camellia.
Azalea, &c.

Climbers may consist of—

Kennedya Maryetta.
Hardenbergia monophylla and *macro-*
phylla.
Sollya linearis.
Gompholobium polymorphum.
Zichya glabrata.
Tropæopium brachyceras, *tricolor*, and
azureum.
Mandevilla suaveolens.
Dolichos lignosus.
Clematis azurea grandiflora.
Veronica speciosa.
Chorozema varium nanum.
Pimelia spectabilis.
Hovea pungens.
Leschenaultia grandiflora.
Mirbelia dilatata.
Statice Dickensoni.
Tropæolum azureum.
Tetranema mexicanum.
Habrothamnus fasciculatus.
 ————— *cyaneus*.

Boronia crenulata.
Eriostemon buxifolium.
Gompholobium versicolor.
Tecoma jasminoides rosea.
Echeveria secunda.
Hardenbergia macrophylla.

SWEET-SCENTED GREEN-HOUSE PLANTS.

Aloysia citriodora.
Daphne odora.
Gardenia radicans.
Jasminum grandiflorum.
Luculia gratissima.
Heliotrope.
 Common Orange, of which the *Brigadier*
multiflora is one of the best.

GREEN-HOUSE PLANTS FLOWERING IN AUTUMN.

Hedychium Gardinerianum (which does
 best when planted in the border of
 the house).
Mimulus glutinosus.
Leonotis Leonurus.
Bouvardia splendens.
Achimenes longiflora.
Chironia frutescens.
Swainsonia galegifolia.
 ————— *alba*.
Mandevilla suaveolens.

Lilium lancifolium and its varieties.
Sollya linearis.
Leschenaultia formosa.

GREEN-HOUSE BULBS.

Oxalis Bowei and *versicolor*.
Lachenalia tricolor.
Sparaxis tricolor and *grandiflora*.
Tritonia palida, *crispa*, and *squalida*.
Ixia patens, *viridiflora*, *aristata*, and
crocata.
Watsonia fulgida.
Hypoxis elegans.

Green-house plants are chiefly kept
 in pots or tubs for moving them into
 shelter in winter, and into the open air
 in summer; for being all exotics from
 warmer parts of the world, they are not
 able to live in the open air in the
 winter.

Most of them will prosper in any
 good rich garden earth. Some sorts,
 however, require a particular compost.
 As to the pots and tubs to contain the
 plants, they must be of different sizes,
 according to that of the plants; and
 when these become too large for pots,
 they must be shifted into tubs, hooped
 with iron, and with handles at top to
 each, of the same metal. See *Flower*
Pots and Potting.

Removing into the open air.—All the
 sorts succeed in the open air from May
 or beginning of June until October; but
 from October until May or June again
 they require the shelter of the green-
 house. The varieties of *Myrtle*, *Gerani-*
um, *Oleander*, *Cistus*, *Phlomis*, *Shrubby*
Aster, *Tree Wormwood*, *Tree Candy*
Tuft, *Yellow Indian* and *Spanish Jas-*
mines, *Indian Bay*, are the first that will
 bear removal into the air; and in June,
 accordingly as the season proves more
 or less favourable, bring forth all the
 others. But this should not be done
 until there is a fair prospect of summer
 being settled.

It is a good observation that when the
Mulberry tree begins to expand its
 leaves this is a certain sign of the ap-
 proach of summer, and settled weather
 fit to begin moving out most sorts of
 green-house exotics. A mild warm day
 should be chosen for this work, and if
 during a warm rain it will be of much
 advantage, as it will wash the leaves
 and branches, and greatly refresh the
 plants.

When they are first brought out it is
 proper to place the plants in some shel-

tered sunny place for a fortnight, till they are inured to the open air, and then in any open exposure, where they are designed to remain for the summer.

As soon as they are brought out let them be cleared from dead leaves and dead wood, and let the earth on the surface of the pots be stirred, taking a little of the old out and adding some fresh in its stead; then give a moderate watering, not only to the soil but also over the heads of the plants. Supply them with water during that season, in hot dry weather. All except the succulent will require it three times a week at least, and in a very hot dry season once a day will be requisite. The succulent kinds must also have a moderate supply of water twice a week in dry weather, observing that the proper time of the day for watering all the sorts at this season is either in a morning before nine o'clock, or in the afternoon after four or five. Moderate rains should not deter from watering, especially such plants as have spreading heads, as these prevent the rains, unless very heavy or constant, from falling in sufficient quantities on the earth of the pots to moisten it properly. In hot weather, if some mowings of short grass, or moss, which is neater, are spread on the surface of the Orange Tree tubs and others, it will greatly preserve the moisture. During the season loosen the surface of the earth occasionally.

Removing into the Green-house.—Towards the latter end of September, or as soon as the nights become cold, begin to return into the green-house the more tender kinds, and especially the succulents should be removed to shelter at the first approach of excessive wet and cold nights.

The Oranges, Lemons, and all the other species of Citrus, should also be moved into shelter in due time, either at the end of September or early in October.

Continue moving in the others as the cold increases, and by the end of the month or first week of November bring in the whole collection; observing, according as the time approaches for moving in the different sorts, to clear them perfectly well from decayed leaves, &c., and let all the pots be well cleaned, and loosen the surface of the earth in each pot, adding a little fresh soil. Their principal culture now will be,

supplying them with fresh air at all opportunities in mild weather, and giving moderate waterings occasionally, picking off decayed leaves as often as they appear, and making moderate fires in severe or foggy weather.

When the plants are first housed, they should have as much free air as the nature of the season will admit, by opening the windows every mild day to their full extent; and if the air is quite temperate, they may remain open at nights for the first week: but in cold nights let them be constantly shut. This work of admitting air must be attended to all winter.

The proper time of day, during the winter, for admission of air is from about eight, nine, or ten in the morning till three in the evening, according to the mildness of the weather; but as the days lengthen and the warmer season advances, give more air in proportion earlier and later in the day, as you shall judge proper, being careful always to shut all close every evening as soon as the sharp air approaches. In foggy weather it is advisable to keep the windows quite close, for the great damp occasioned by fogs is very pernicious to plants whilst they are confined in the house; likewise in frosty weather keep the house close, unless the frost is moderate, and the middle of the day sunny and warm, when some of the windows may be opened a little, but shut close again if the sun is clouded. In severe weather let the shutters also be closed every night, and occasionally in severe days, and be particularly careful to water with great moderation whilst the plants remain in the green-house.

A sunny day from about eleven to two o'clock, is then the proper time for watering. (*Abercombie.*)

See *January* and other months for the routine work.

GREEN MANURE is a mass of recently growing plants dug whilst green and fresh into the soil, for the purpose of enriching it; and it is a rule without any exception, that all fresh vegetable matters so turned into the earth do render it more fertile, and if plants are grown upon the soil for this purpose, the greater the amount of the surface of leaves in proportion to that of roots the better, because such plants obtain a large proportion of their chief constitu-

ent,—the chief constituent of all plants, carbon,—from the atmosphere: they, therefore, return to the soil more decomposing matter than they have taken from it.

The putrefaction of the vegetables, and the gases in that case emitted, says my brother, Mr. Cuthbert Johnson, “appear to be on all occasions highly invigorating and nourishing to the succeeding crop. During this operation, the presence of water is essentially necessary, and is most probably decomposed. The gases produced vary in different plants; those which contain gluten emit ammonia; onions and a few others evolve phosphorus; hydrogen, carbonic acid gas, and carburetted hydrogen gas, with various vegetable matters, are almost always abundantly formed. All these gases when mixed with the soil are very nourishing to the plants growing upon it. The observations of the farmer assure us that they are so. He tells us that all green manures cannot be employed in too fresh a state, that the best corn is grown where the richest turf has preceded it, and that where there is a good produce of red clover there will assuredly follow an excellent crop of wheat; he finds also that when he ploughs in his crop of buckwheat to enrich his land, that this is most advantageously done when the plant is coming into flower.”—*Farm. Encyc.*

Sea Weed is a species of green manure, for it ought to be employed whilst quite fresh. There are many species, and they differ very essentially in their components. The *Laurinaria*, those long, tawny-green, ribbon-like algæ so common on our coasts, contain besides vegetable matter a large proportion of the salts of potash in addition to those of soda; whereas the *Fuci* contain none of the salts of potash. All, however, are excellent manures, and I know a garden, near Southampton, very productive, that for some years has had no other manure. It is particularly good as a manure for potatoes. The *Fucus vesiculosus*, so distinguishable by the bladders full of air embedded in its leaves, is a very excellent manure. It contains, when dry, about 84 parts vegetable matter, 13 parts sulphate of lime and magnesia, with a little phosphate of lime, and 3 parts sulphate and muriate of soda.

The advantage of green manure is practically understood by thousands of our farmers, who, though they may be unable to philosophize upon the subject or refer to its true chemical cause, fully appreciate its value.

The great desideratum of those who aim at enriching the soil, is to produce clover,—that attained, the rest is easy. Clover, when turned in, prepares the land for every description of crop, and places the whole under the control of the husbandman.

GREVILLEA. Forty-two species. Green-house evergreen shrubs. Ripe cuttings, and some species, seeds. Sand, loam and peat.

GRIFFINIA. Three species. Stove bulbous perennials. Offsets. Seeds. Turfy loam, white sand and peat.

GRINDELIA. Nine species. Chiefly green-house evergreen shrubs. *G. angustifolia* and *G. squamosa* are herbaceous perennials, and *G. ciliata* a hardy annual. Cuttings. Loam and peat.

GRISLEA. Two species. Stove evergreen shrubs. Cuttings. Sandy peat and loam.

GROBYA *Amherstiae*. Stove orchid. Division. Wood.

GROTTO, is a resting place, formed rudely of rock-work, roots of trees, and shells, and is most appropriately placed beneath the deep shade of woods, and on the margin of water. Its intention is to be a cool retreat during summer.

GROUND CHERRY. *Cerasus Chamaecerasus*.

GROUND CHRISTA. *Cassia Chamaechrista*.

GROUND CISTUS. *Rhododendron Chamaecistus*.

GROVE, is a moderately extensive association of trees without underwood.

“The character of a grove is beauty; for fine trees are lovely objects, and a grove is an assemblage of them, in which every individual retains much of its own peculiar elegance, and whatever it loses is transferred to the superior beauty of the whole. To a grove, therefore, which admits of endless variety in the disposition of the trees, differences in their shapes and their greens are seldom very important, and sometimes they are detrimental. Strong contrasts scatter trees which are thinly planted, and which have not the connexion of underwood; they no longer form one

plantation; they are a number of single trees. A thick grove is not, indeed, exposed to this mischief, and certain situations may recommend different shapes and different greens for their effects upon the surface. The eye, attracted into the depth of the grove, passes by little circumstances at the entrance; even varieties in the form of the line do not always engage the attention, they are not so apparent as in a continued thick-
et, and are scarcely seen if they are not considerable.

“But the surface and the outline are not the only circumstances to be attended to. Though a grove be beautiful as an object, it is, besides, delightful as a spot to walk or to sit in; and the choice and the disposition of the trees for effect within are therefore a principal consideration. Mere irregularity alone will not please, strict order is there more agreeable than absolute confusion, and some meaning better than none. A regular plantation has a degree of beauty; but it gives no satisfaction, because we know that the same number of trees might be more beautifully arranged. A disposition, however, in which the lines only are broken, without varying the distances, is less natural than any; for though we cannot find straight lines in a forest, we are habituated to them in the hedge-rows of fields; but neither in wild nor in cultivated nature do we ever see trees equidistant from each other; that regularity belongs to art alone. The distances, therefore, should be strikingly different; the trees should gather into groups, or stand in various irregular lines, and describe several figures; the intervals between them should be contrasted both in shape and in dimensions; a large space should in some places be quite open, in others the trees should be so close together as hardly to leave a passage between them; and in others as far apart as the connexion will allow. In the forms and the varieties of these groups, these lines, and these openings, principally consists the interior beauty of a grove.”
—*Whateley*.

GROWTH. It may be taken as a universal maxim in gardening, that slow growth and smallness of size increases the intensity of flavour, and that rapidity of growth and increase of size render flavour more mild. Fruit, therefore, should be ripened slowly, and be pre-

ferred of a moderate size; but culinary vegetables should be grown rapidly, and of as gigantic a size as may be.

GRYLLOTALPA. See *Mole-Cricket*.

GUAIACUM. Three species. Stove evergreen trees. Ripe cuttings. Rich loam.

GUANO. This now celebrated manure has been known as the chief fertilizer employed by the Peruvians, almost as long as that part of the New World has been recognized by geographers. Its name, in the language of that country, signifies *the manure*—and it merits such distinction, as being one of the most powerful assistants to vegetation which can be applied to the soil. Guano is not peculiar to Peru, but is found in immense beds upon many rocks and islands of the Atlantic, being the excrements of the marine birds frequenting those ocean solitudes. It has been lately analyzed by Dr. Ure, who reports it as composed of the following proportional constituents:—

Azotized organic matter, including urate of ammonia, and capable of affording from 8 to 17 per cent. of ammonia by slow decomposition in the soil	50.0
Water	11.0
Phosphate of lime	25.0
Ammonia, phosphate of magnesia, phosphate of ammonia, and oxalate of ammonia, containing from 4 to 9 per cent. of ammonia	13.0
Siliceous matter	1.0

This analysis explains the source from whence failure has been derived to many who have tried it. It is the most violently stimulating of all the known natural manures, and they have applied it too abundantly. This is shown by the experiments of Mr. Maund. When applied to *Strawberries* once a week in a liquid state, (four ounces to a gallon,) it made them very vigorous and productive; but sprinkled upon some young seedlings of the same fruit it killed them. Two ounces per yard, (five cwt. per acre,) were sprinkled over *Onions*, and they doubled the untreated in size. *Potatoes* manured with one ounce and a half per yard, were rendered much more luxuriant than others having no

guano. *Brussels Sprouts* were half destroyed by being planted in immediate contact with nine parts earth and one part guano. *Geraniums* were greatly injured by liquid manure of guano, (four ounces per gallon,) but "Plants of various sorts in pots, watered only with guano water, half an ounce to a gallon, have flourished astonishingly; none have failed. These are lessons which cannot be mistaken."—*Auctorium*, 223. Mr. Rendle and other persons record, as the result of dearly-purchased experience, that where guano has failed to be beneficial, or has been injurious, it has been applied in quantities too powerful for the plants to bear. In a liquid state, *half an ounce per gallon*, and given to growing plants once a week, it never fails to be productive of vigour.

There is reason to fear that all the advantages attributed to Guano, may not be realized. That it has produced striking effects on certain crops cannot be questioned—especially on grass, wheat and Indian corn; but we are far from subscribing to the opinion of those who in their zealous praise of this new fertilizer, assert that it is cheaper to buy it, than *haul* manure from the barn-yard to the fields!

There are many crops on which it appears to produce but little effect: The writer has used over two tons of what was reputed to be the best Peruvian guano, in experiments, chiefly on Kitchen garden vegetables carefully noting the quantity applied, mode, &c., but in nearly every instance without perceiving any important result.—Doubtless much depends on the soil, and the presence or absence of those constituents which abound in guano—where they already exist in the soil, in sufficient quantity, no benefit can result from its application.

GUATTERIA. Five species. Stove evergreen shrubs or trees. Cuttings. Loam, peat, and sand.

GUAVA. *Psidium*.

GUAZUMA. Three species. Stove evergreen trees. Cuttings. Peat and loam.

GUELDER ROSE. *Viburnum opulus*.

GUERNSEY LILY. *Nerine sarniensis*.

GUETTARDA. Seven species. Stove evergreen trees. Cuttings. Peat and loam.

GUILANDINA. Two species. Stove

evergreen shrubs. Cuttings or seeds. Sandy peat and loam.

GUINEA-PEACH. *Sarcocephalus*.

GUINEA-PLUM. *Parinarium excelsum*.

GUM ARABIC TREE. *Acacia arabica*.

GUM CISTUS. *Cistus Ladaniferus*.

GUM TREE. *Eucalyptus robusta*.

GUMMING. See *Extravasated Sap*.

GUSTAVIA *augusta*. Stove evergreen tree. Cuttings. Rich soil.

GUZMANNIA *tricolor*. Stove herbaceous perennial. Suckers. Rich mould.

GYMNADENIA. Four species. Hardy orchids. Division. Sandy loam and peat.

GYMNEMA. Four species. Stove evergreen twiners. Cuttings. Loam and peat.

GYMNOCLADUS *canadensis*. Hardy deciduous tree. Cuttings. Open loamy soil.

GYMNOGRAMMA. Fourteen species. Stove herbaceous perennials. Division. Loam and peat.

GYMNOLOMIA. Three species. Stove evergreen shrubs. Cuttings. Loam and peat.

GYMNOSTACHYS *anceps*. Green-house herbaceous perennials. Suckers. Peat and loam.

GYNANDROPSIS. Six species. Hardy or stove annuals and biennials. Seeds. Sandy loam.

GYP SUM, or Plaster of Paris, is a sulphate of lime, composed of—

Sulphuric acid 43

Lime 33

Water 24

It has been employed advantageously as a manure to the turnip and potato, at the rate of 3 cwt. per acre. Potato sets are frequently rolled in it when pulverized. It has been recommended to be sprinkled in stables, and to be mixed with dunghills, "to fix the ammonia," as it is popularly termed. That ammoniacal fumes are given out from the urine of horses, and from decomposing dunghills, is true; but it is quite as true, that sulphate of lime thus employed will not detain a thousandth part of them, owing to the sulphuric acid having a greater affinity for the ammonia than for lime, and carbonic acid having a greater affinity for lime than for ammonia. And it is also true, that all the ammonia lost in fumes from a dunghill

might be more readily and as cheaply restored to it by mixing with it, when dug into the soil, a little of the ammoniacal liquor from the gas works. Gypsum is extensively used in Pennsylvania and in many cases with the best results. For its introduction originally we are indebted to the late Judge Peters; from a "short notice" of whom, by Samuel Breck, Esq., we extract the following:

"As a practical farmer, Mr. Peters had from time to time communicated the results of the experiments made at Belmont, to such of his neighbours as chose to profit by them; but he had not written much, if anything, upon agriculture, before the year 1797. His first publication was then made, and contained a statement of facts and opinions in relation to the use of Gypsum. This pamphlet circulated widely, and produced such a change in husbandry, by introducing the culture of clover, and other artificial grasses, as gave, we all know, a magical increase to the value of farms. Estates which until then were unable to maintain stock, for want of winter fodder, and summer pasture, were suddenly brought into culture, and made productive. Formerly, on a farm destitute of natural meadow, no stock could be supported; and even where natural meadow existed, the barn yard was exhausted to keep up sufficient fertility, (in the absence of irrigation,) to feed a very few horses and black cattle.

"Such was the situation of our husbandry, for some years after the revolution. It is proper to advert to it, that we may understand the full extent of our obligation to the Judge. In the year 1770, he was shown the effects of gypsum on clover, in a city lot, occupied by Mr. Jacob Barge, on the commons of Philadelphia.

"The secret of its powerful agency came from Germany, where it was accidentally discovered. Mr. Peters obtained a small quantity, which he used successfully, and gradually promoted its consumption, until, by his example, and his publications, the importation from Nova Scotia alone, into the single port of Philadelphia, increased to the enormous amount of fourteen thousand tons annually. This was before the discovery of that fossil in the United States.

"Inquire in the counties of Chester, Lancaster, and others around us, where clover is so beneficially cultivated, how much is due to that excellent man, for the great pains he took to extend the use of gypsum? On this subject, I very recently transmitted to the Judge, a testimonial of gratitude from one of the most intelligent persons of Lancaster; who unhesitatingly ascribes to Mr. Peters' book on plaster, and his other agricultural essays, the merit of having produced a good part of the rich cultivation, for which that country is so celebrated."

GYRENIA biflora. Half-hardy bulbous perennials. Division. Peat and loam.

GYROCARPUS. Two species. Stove evergreen trees. Cuttings. Loam and peat.

HABENARIA. Ten species. Stove orchids. Division. Leaf-mould and peat.

HABRANTHUS. Fourteen species. Green-house and hardy bulbs. Offsets and seeds. Sandy loam and peat.

HÆMADICTYON venosum. Stove evergreen twiner. Cuttings. Loam and peat.

HÆMANTHUS. Twenty-one species. Green-house bulbs. Offsets. Sandy loam and peat.

HÆMILIS. See *Tinea*.

HÆMODORUM. Two species. Green-house herbaceous. Division. Loam and peat.

HA-HA, is a sunk fence, being placed at the bottom of a deep and spreading ditch, either to avoid any interruption to an expanse of surface, or to let in a desired prospect. As all deceptions are unsatisfactory to good taste, and as when viewed lengthwise these fences are formal and displeasing, they ought never to be adopted except in extreme cases.

HAIR. See *Animal Matters*.

HAKEA. Forty-eight species. Green-house evergreen shrubs. Cuttings. Loam, peat, and sand.

HALESIA. Snowdrop Tree. Three species. Hardy deciduous shrubs. Cuttings and layers. Common soil.

HALF-HARDY PLANTS are those which require partial shelter, as in a cold pit or frame, during the winter. Here some attention is required to exclude from them dampness and frost, but especially the first. On these points

Mr. W. Wakefield gives these good directions:—

“To prevent dampness there must be a free circulation of air; the plants must be placed on a dry bottom; and if they are in a situation which will admit of a fire occasionally, it will render the pits or house dry, but it should be used very sparingly, and only when absolutely necessary. But even with all care and attention, damp will attack some plants, and generally those that are most succulent in their nature, or the young and tender tops of others. We should therefore watch narrowly and remove every leaf or shoot affected, as damp not only destroys the individual immediately affected, but extends its influence to those in the neighbourhood of the one so affected. It is contagious; it engenders mould, which being a species of fungus, is rapidly disseminated, attacking and destroying wherever the damp has prepared the leaves for its reception. Neither should plants be too much crowded, as that obstructs the free circulation of air.

“Watering should of course be done sparingly, but still it will be required occasionally. Care, however, should be taken to preserve the foliage as dry as possible, as, there being but little sun in winter, and that not of sufficient strength to evaporate the superabundant moisture rapidly, it quickly rots the leaves, especially of *Pelargoniums*, and similar plants having leaves which form a kind of dish in which the water accumulates in considerable quantities.

“When fire is had recourse to for drying the house or pits, choose a fine day, and give all the air possible, so that the moisture dislodged by the heat may be dispersed.

“If the season is likely to be dry, first make a hole for the plant, and in the bottom of this put some rotten dung, or any sort of material that will retain water. Water this well, and then put in the plant, filling the hole to within two inches of the surface; again water well, and then fill up the hole.

“If obliged to water the plants afterwards, cause the beds to be hoed over next day as soon as they are dry enough; plants do better under this treatment than by watering them so much as is usually done when there is no appearance of damp on the leaves over late in the evening.”—*Gard. Chron.*

HALIMODENDRON. Three species. Hardy deciduous shrubs. Layers and seeds, or grafts on *Robinia*. Sandy loam.

HALLERIA. Two species. Greenhouse evergreen shrubs. Cuttings. Rich sandy loam.

HALTICA. See *Black Fly*.

HAMAMELIS. Witch Hazel. Two species. Hardy deciduous trees. Layers. Common soil.

HAMBURGH PARSLEY. See *Parsley* (Hamburgh).

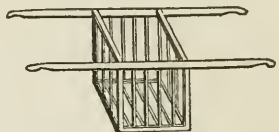
HAMELIA. Five species. Stove evergreen shrubs. Cuttings. Peat and loam.

HAMILTONIA. Two species. Stove evergreen shrubs. Cuttings. Loam and peat.

HANBURY. See *Ambury*.

HANDBARROW is best made of this form:—

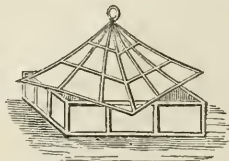
Fig. 77.



The cage below is useful for carrying leaves and other litter; and when the close moveable cover is on, it serves as a conveyance for plants in large pots or tubs, which, when in flower or bearing fruit, might be too violently shaken in a wheelbarrow.

HAND-GLASS is a portable glass-case used for sheltering cauliflowers and other plants in winter, and during early spring, or to retain a regular supply of moisture to cuttings until they are rooted. The most durable and convenient are made with cast iron framing of this form:—

Fig. 78.



They are sometimes made with moveable tops as here represented, but the only advantage it affords is, that several of the lower portions may be placed

upon each other to protect any tall growing shrub in severe weather, otherwise they are more troublesome to move, and more liable to breakage than if made entire.

HAND-WEEDING: much of it might be banished from the garden, if in the kitchen department all crops were inserted in drills. This is most desirable; for the stirring of the surface consequent to hoeing, is much more beneficial to the crops, and cannot be repeated too frequently.

HA PALOSTEPHIUM. Eight species. Hardy herbaceous. Division and seed. Sandy rich soil.

HARDENBERGIA *monophylla* is a green-house climber, the cultivation of which is thus narrated by Mr. G. Watson:—

“Train with five leading shoots, one from the centre of the pot, to which a long, small, neat stick is placed; the other four being fastened to four similar sticks at regular distances round the edge of the pot. From each of these leading shoots proceed numerous side-branches which are densely covered with flowers. When the plant has done blooming, which is by the end of May or beginning of June, still allow it to remain in the green-house until the shoots are well ripened. During this time the plant is watered sparingly; for it is only by moderating the supply of water that we can imitate those periodical seasons of rest to which this, as well as all other exotic plants, is exposed in its native climate.

“By the first week in August it is taken from the green-house and well soaked with water, then placed in the open air in a sheltered situation, but fully exposed to the sun, being double potted to prevent the sun's rays from destroying the small fibres, which are the principal feeding organs.

“The whole of the side shoots are pruned to one or not more than two eyes, and the leading shoots cut back according to their strength, so as to call into action the whole of the remaining buds. As soon as the new shoots are from one to two inches in length, the plant is taken from the pot and nearly the whole of the soil is shaken from its roots; the stronger roots are at the same time cut back to smaller fibres. It is then repotted in a new or clean washed pot, thoroughly drained.

“The soil in which it thrives well is chopped turfy heath-mould, mixed with a little sand. After forcing it is placed in a shady place for a short time, and by degrees exposed fully to the sun, being taken into the green-house by the end of September.”—*Gard. Chron.*

HARDY PLANTS are those which endure uninjured our seasons without protection. *Half-hardy Plants* are those which require a temporary protection during the colder portions of the year.

HAREBELL. *Campanula rotundifolia*.

HARES and **RABBITS** are deterred from injuring trees and shrubs by mixing night-soil and clay in water, and daubing it over the stems with a brush, in November; and if the winter proves very wet, in February. The November dressing is, however, generally sufficient. This mixture has stopped their depredations entirely, even when they had commenced operations. — *Gard. Chron.*

HARE'S-EAR. *Bupleurum*.

HARE'S-FERN. *Davallia canariensis*.

HARE'S-FOOT. *Ochromalagopus*.

HARONGA *madagascariensis*. Stove evergreen shrub. Cuttings. Loam and peat.

HARPALYCE. Four species. Hardy herbaceous. Seeds. Common soil.

HARRISONIA *loniceroides*. Stove evergreen shrub. Cuttings. Loam and peat.

HARTOGIA *capensis*. Green-house evergreen shrub. Cuttings. Loam and peat.

HAUTBOY. See **STRAWBERRY**.

HAWK FLY. See **SCÆVA**.

HAWKWEED. *Hieracium*.

HAWORTHIA. Sixty-two species. Green-house succulents. Suckers or cuttings of leaves. Sandy loam and leaf-mould.

HAWTHORN. *Cratægus*.

HAWTHORN BUTTERFLY. See **PIERIS**.

HAYLOCKIA *pussilia*. Half-hardy bulb. Offsets. Sandy loam.

HAZEL. *Corylus avellana*.

HEADING, or as it is also termed *Cabbaging* or *Loaving*, is an inaptitude to unfold the central leaves, characterizing the various members of the Cabbage tribe. They have their centre or bud composed of a larger number of leaves than usual, and these, in some

instances, are so complexly combined that the plant has not sufficient power to force them open to permit the protrusion of the seed-stem. The closeness of the heading is regulated by the exposure to the light. In a shady situation all the leaves are required to elaborate the sap, on account of the deficient light rendering each less active; therefore they open as they are formed. In a free exposure a few leaves are able to effect the requisite decomposition; and hence the reason why cabbages always have "*harder hearts*" in summer than in spring or autumn, when the light is less intense.

HEADING-DOWN is cutting off entirely or to a considerable extent, the branches of a tree or shrub—a process not rashly to be resorted to, and adapted only to reduce them when the plant seems declining in vigour, or has attained an undesirable size.

HEART'S-EASE. See *Pansy*.

HEAT is the prime agent employed by the Almighty Creator to call vegetable life into existence, to develop vegetable form, to effect all vegetable changes, and to ripen all vegetable produce. All these effects are performed most efficiently, in the case of every plant, at some different temperature or degree of heat; and he who ascertains most correctly those heats, has taken a gigantic step towards excellence as a gardener. An uncongenial heat is as pernicious to vegetables as to animals. Every plant has a particular temperature without which its functions cease; but the majority of them luxuriate most in a climate of which the extreme temperature does not much exceed 32° and 90°. No seed will vegetate—no sap will circulate—at a temperature at or below the freezing point of water. No cultivation will render plants, natives of the torrid zone, capable of bearing the rigours of our winters, although their offspring, raised from seed, may be rendered much more hardy than their parents. Others are capable of resisting the greatest known cold to which they can be exposed; yet all have degrees of temperature most congenial to them, and if subjected to lower temperatures, are less or more injured proportionately to the intensity of that reduction. If the reduction of temperature be only slightly below that which is congenial, it only causes the

growth of the plant to diminish and its colour to become more pale; this effect being now produced by the plant's torpidity, or want of excitement to perform the requisite elaboration of the sap, as it is by over-excitement when made to vegetate in a temperature which is too elevated.

If blossoms are produced at all, they are unfertile, and the entire aspect of the plant betrays that its secretions are not healthy and its functions are deadened. Mr. Knight says, "that melon and cucumber plants, if grown in a temperature too low, produce an excess of female blossoms; but if the temperature be too high, blossoms of the opposite sex are by far too profuse." The drier the air the greater is the amount of moisture transpired; and this becomes so excessive, if it be also promoted by a high temperature, that plants in hot-houses, where it has occurred often, dry up as if burned. The justly lamented Mr. Daniell has well illustrated this by showing, that if the temperature of a hot-house be raised only five degrees, viz. from 75° to 80°, whilst the air within it retains the same degree of moisture, a plant that in the lower temperature exhaled fifty-seven grains of moisture, would in the higher temperature, exhale one hundred and twenty grains in the same space of time.

Plants, however, like animals, can bear a higher temperature in dry air than they can in air charged with vapour. Animals are scalded in the latter if the temperature is very elevated, and plants die, under similar circumstances, as if boiled. MM. Edwards and Colin found kidney-beans sustained no injury, when the air was dry, at a temperature of 167°; but they died in a few minutes if the air was moist. Other plants under similar circumstances, would perish probably at a much lower temperature; and the fact affords a warning to the gardener to have the atmosphere in his stoves very dry whenever he wishes to elevate their temperature for the destruction of insects or other purposes.

Some plants, like some animals, are able to endure a very high degree of temperature. Sir Joseph Banks and others have breathed for many minutes in an atmosphere hot enough to cook eggs; and I have myself travelled in Bengal breath-

ing air, without inconvenience, which rendered the silver-mountings of my green spectacles too hot to be borne without their occasional removal.

So do certain plants flourish in hot-water springs of which the temperature varies between the scalding heats of from 150° to 180° of Fahrenheit's thermometer; and others have been found growing freely on the edges of volcanoes, in an atmosphere heated above the boiling point of water. Indeed, it is quite certain that most plants will better bear, for a short time, an elevated temperature which, if long continued, would destroy them, than they can a low temperature. Thus a temperature much above the freezing point of water, to orchidaceous and other tropical plants, is generally fatal if endured by them for only a few minutes; whereas a considerable elevation above a salutary temperature is rarely injurious to plants. But this is not universally the case; for the elegant *Primula marginata* is so impatient of heat that, although just about to bloom, it never opens a bud, if brought into a room in which there is a fire.

The temperature should always be regulated, in our hot-houses, with a due regard to the light. At night it should be so low as to put the circulation of the sap into a comparative state of rest; and in dull days the temperature should be full 10° lower than in those of bright sunshine.

HEATHS (*Ericæ*). This truly beautiful tribe is in the climate of the United States of but little interest. Scarcely half a dozen of the almost countless species and varieties of *Erica* have proved capable of resisting the effects of our restless climate. It is a curious fact, that, though this genus is diffused over Europe, Asia, and Africa, not a single species has been found in the Western hemisphere.

Varieties.—Of these the following are good selections:—

HARDY CAPE HEATHS, FOR FLOWERING DURING THE SUMMER MONTHS.

- Erica Bowieana*, white.
- *Grandiflora*, yellow.
- *Ventricosa*, pink.
- *Echiflora*, purple.
- *Beaumontiana*, bluish.
- *Mundula*, pink.
- *Cerinthoides*, scarlet.

Erica Ampullacea.

- *Aristata*, dark crimson and pink.
- *Aggregata*, purple.
- *Vindiflora*, green and pink.
- *Phrysodes*, white.

USEFUL KINDS ARE:—

- *Hartnelli*, pink.
- *Aristata Major*, red.
- *Acuminata longiflora*, purple.
- *Tenuiflora*, white, with pink shade.
- *Inflata*, white.
- *Archeriana*, scarlet.
- *Depressa*, yellow.
- *Elegans*, light purple.
- *Cavendishii*, yellow.
- *Mutabilis*, light purple.
- *Retorta Major*, pink.
- *Lamberti Rosea*, flesh-coloured.
- *Hyemalis*, purple, tipped with white.
- *Tricolor*, red.
- *Lirinæoides Superba*, purple, with white tip.
- *Jasmini*, flora alba, white, and all the varieties of *Ventricosa*.

VARIETIES BLOOMING BETWEEN NOVEMBER AND MAY.

Erica Verticillata.

- *Mammosa*, M. pallida.
- *Hyemalis*.
- *Willmoreana*.
- *Westcottii*.
- *Grandinosa*.
- *Arbuscula*.
- *Umbellata*.
- *Rubra P.*, alba.
- *Pyramidalis*.
- *Transparens*.
- *Regermirans*.

Mr. Reid very justly remarks, "that, in small establishments, the green-house being generally furnished with vines, to keep plants in them in summer is out of the question; he therefore selects three or four plants of only the winter flowering sorts, such as would keep up a show of bloom from November till April. Early in May the plants might be all taken out, and the house should be shut up for the purpose of forwarding the vines."

With something like the following selection, a very nice show of bloom might be kept up during all the time that it is necessary to have the plants in the house; and they are, with very

few exceptions, strong growers and free bloomers, and all can be bought at a low rate:—

- Erica Westcottii.
- Colorans.
- Arbuscula.
- Hyemalis.
- Picta.
- Transparens.
- Nova.
- Vernix.
- Vernix Coccinea.
- Cerinthoides.
- Superba.
- Mutabilis.
- Bicolor.
- Willmoreana.
- Rubra Calyx.
- Lambertiana.
- Lambertiana Rosea.
- Exsurgens.
- Coccinea.
- Archeriana.
- Præstans.
- Pyramidalis Verna.
- Autumnalis.
- Tenella.
- Gracilis Autumnalis.
- Verna.
- Pellucida.
- Mammosa.
- Pallida.
- Curviflora.
- Scabriuscula.

Propagation.—Mr. Fleming gives the following very full and excellent directions:—

“Heaths are propagated in two ways—by seeds and by cuttings. *Seeds* are either obtained from the Cape of Good Hope, or are gathered from plants which have flowered in this country. When they are received from the Cape they should be sown immediately, unless this should happen late in the autumn, or in winter; and in that case the sowing should be deferred until spring. When seeds of this kind are sown late in the year, they either do not vegetate at all, or, if they are excited into growth, the stimulus is so weak, and the days are so short and dull, that they get sickly, and frequently damp off. For the same reason, seeds which are saved in this country should either be sown in spring, or very early in summer.

“Some flat pots, or seed-pans, should be half filled with potsherds; and over

these a layer of turfy peat should be placed to prevent the soil from being washed down and destroying the drainage. The pots should then be filled to within half an inch of the top with fine peat, and this should be slightly pressed down with the back of the hand, or with the bottom of a small flower-pot, to make it level and more solid. If this is not attended to, the seeds are liable to sink too deep in the soil, and are prevented from germinating. They should then be sown, and slightly covered with fine peat soil, after which they should be watered and removed to the seed-house. In all large nurseries or gardens, a house, pit, or frame, is set apart for raising seeds. It is to a place of this kind that the pots containing the heath-seed should be removed, and as we suppose this to be done in spring, no artificial heat will be required, that received from the sun being quite sufficient. If the seed has been good, the young plants will soon make their appearance above ground. As they get strong, the shading should be gradually discontinued, and more air admitted, until they are a little hardened and ready to pot off. They should then be put singly into thumb-pots in sandy peat soil well watered, and afterwards removed to a close-shaded frame. Here they will remain for ten days or a fortnight, until their roots establish themselves in their new quarters, when more air may gradually be admitted, and the plants subjected to the same treatment as those in the green-house or heathery.”—*Gard. Chron.*

Cuttings.—The same good authority says that, “No particular time can be specified for striking cuttings of heaths, because the plants are in a fit state for taking off the cuttings at different times; but the earlier in the season the better, although many cultivators succeed perfectly so late as the months of August and September. The plants from which the cuttings are taken must be perfectly healthy. The wood should be firm and nearly ripe, because if taken when very young it is almost certain to damp off. The short lateral shoots, about an inch or an inch and a half long, should always be chosen, and the leaves stripped off them to about half their length, and the ends cut across with a sharp knife; in this state they are ready for the cutting-pot. The cutting-pots should be

prepared in the following manner. Fill them about two-thirds with broken pots, and cover these with a thin stratum of turfy peat, or some other substance to prevent the sand with which the pots are filled up from choking the drainage. The silver sand, common about London, is very well adapted for striking heaths; but almost any sand will answer the purpose; it is generally preferred as free from the rusty colour of iron as possible. The cuttings may then be inserted in the sand, not deeply, but merely deep enough to support themselves; from a quarter to half an inch is quite sufficient. They must then be well watered; bell glasses are of great service in striking them, but certainly not indispensable to success. When they are used, they must be frequently taken off and wiped dry, otherwise the moisture will probably rot the cuttings. When they are dispensed with the cuttings should be placed in a situation which is moist and shaded, and then they will be surrounded in a great measure with the same circumstances as under a bell glass.

"Very little artificial heat is necessary in striking heaths, much is certainly injurious. A cucumber or melon frame nearly exhausted, or the shaded part of a cool stove, will answer the purpose early in spring, and later in the season, when the sun-heat is greater, a close fence slightly shaded is all that is required. The care required afterwards is to shade during bright sunshine, to remove into the shade early in the afternoon, and also to see that the watering is not neglected.

"More, perhaps, depends upon the kind of water which is used, and the regularity with which it is given, than upon anything else in operation; if we except the selection of proper cuttings. Rain or river water is by far the best kind to use. After the cuttings have struck root they should be gradually hardened by exposure to the air before they are potted off. Small thumb-pots are the best for the first potting, and the soil used, should be very sandy peat. The greatest care should be taken to preserve the young rootless from injury, because if this is not attended to, the plants will receive a sudden check at first, which is very prejudicial. After potting, they should be removed to a close-shaded frame, and treated in the

same manner as the young seedlings above described."—*Gard. Chron.*

Soil.—"The best for the growth of heaths is that rich brown turfy peat, commonly found on the surface of land where the native heath grows. Sometimes grass will be found growing very strong on this soil, as at Shirley Common; but wherever the land is barren, it is an indication of poor soil, and should not be selected. It is always best to have it dug and brought home to the compost yard at least a year before it is to be used. The fibrous matter will then have time to decay, and will make excellent manure for the roots of the plants. During the winter and spring it should be several times turned over, and by this means the whole will get well mixed and exposed to the influence of the frost. Peat soil is generally found naturally well mixed with fine white sand; but where this is not the case, a small quantity should be added to the soil before it is used."—*Gard. Chron.*

After-Culture, Potting, &c.—"As the young plants grow and fill the pots of a larger size, follow the different sizes of the pots commonly made in the potteries from 'thumbs' downwards to those of a larger size. Thus the young cuttings or seedlings are first potted in 'thumbs,' then in sixties, then forty-eights, and so on. At every shifting the neck of the plant ought to be kept a little higher than the soil, and when large pots or tubs are used, Mr. M'Nab's plan of mixing small pieces of freestone with the soil is a most excellent one; of course it is necessary for the health of the plants to have the pots properly drained and the worms kept out of them.

"Heaths will not bear their roots being cut or destroyed, particularly after the plants attain a certain age. The shifting may be done at any season except winter; but this must be regulated in a great degree by the state of the plants, as they flower and grow at so many different times. Spring, however, is the time when the most of them ought to be shifted, and if they are placed out of doors during summer, they will all require to be looked over again before they are brought into the house in autumn. The kind of water which is used for these plants is of the greatest consequence in keeping them in a high state of health. When the

pots are properly drained, there is not much danger to be apprehended from over watering; but the plants are sure to suffer if the ball is allowed to get too dry, and hence the great use of small pieces of freestone, recommended by Mr. M^cNab. In the winter season, when there is any danger from frost, heaths and all other hardy green-house plants should always be watered in the early part of the day, as they are much more likely to be injured if watered in the afternoon. It is the best plan under these circumstances to keep them as dry as they will bear without injury, for wet soil freezes much sooner than dry. Frequent syringing is also of great use in fine weather; but this must never be done when the plants are likely to suffer from damp, or when the weather is cold and frosty. The principal art of making fine specimens of heaths, consists in dwarfing them, and forming them into round green bushes. This is done by pinching out the points of the shoots when the plants are young, and continuing the practice whenever the stems are inclined to grow long-jointed. It must, however, be done in a judicious manner, otherwise if done at the wrong season the flowering will be spoiled. The proper time is after the flowering season is past, or when the plant is growing freely, and before it has begun to form its flower buds."—*Gard. Chron.*

HEBENSTREITIA. Ten species. Green-house evergreen shrubs. Cuttings. Sandy loam and peat.

HEDEOMA. Two species. Hardy annuals. Seeds. Common soil.

HEDERA. Ivy. Two species and several varieties. Hardy evergreen climbers. Slips. Common soil.

HEDGE, properly includes every kind of fence, but the present details apply for the most part to growing fences. Abercrombie says, that "all outward hedges designed as fences should have a ditch on the outside, three or four feet wide at the top, three deep, sloping to one wide at bottom, raising a low bank on the inside on which to plant the hedge, which may be planted either on the side of the said inner bank in two rows, one above the other a foot asunder, planting them as you advance in forming the ditch and bank, or may be planted entirely on the top of the bank, first forming the ditch

and bank, and leveling the top of the bank so as to form a sort of border, then plant the sets in one or two rows the whole length; but two rows a foot asunder is the most eligible for all outward fences, as it always forms the thickest, strongest, and most effectual hedge-fence. Mark out a space for a ditch three or four feet wide at top, which is to be digged three feet deep each side, sloping gradually to a foot wide at bottom, forming a bank along upon the inner edge on which to bed or plant, which should be planted as you advance in forming the ditch and bank. Having lined out the width of the ditch, then along the inner edge lay a row of square spit turfs, grass side downwards, to form the beginning of the bank, backing it up with spits of earth from the formation of the ditch, and top it with a little of the fine mould or crumbs; and then upon this proceed to lay the first row of plants: first let the sets be headed to about five or six inches, and the roots trimmed, then lay them upon the bed of turf with their tops outward, in an upward direction, about ten or twelve inches asunder, covering their roots with mould also out of the ditch; and then lay another row of turf along upon the necks of the plants, and more mould from the ditch upon, and behind, the turf; and when the bank is thus raised a foot above the row of sets, plant another row in the same manner, placing each set against the spaces of those of the first row, so covering them with more earth from the ditch to the depth of three feet, sloping each side to one foot width at bottom, and trim up all remaining earth, throwing a sufficiency behind the top of the banking to bank up the whole even, in a sort of broad border, all the way along the top, sloping a little back, so as to correspond nearly with the adjoining ground. But in planting for an outward fence, some form the ditch and bank first as above, and plant the sets in two rows along the top; that is, after having formed the ditch and bank, then leveling the top forming a foot of border all along a yard wide; plant the sets along the middle thereof upright, in two rows a foot asunder, and six inches distant in each row, observing the same when intended to raise a hedge at once from seed sowed where you design the hedge to be, sowing them along the top in

drills a foot asunder. Sometimes when hedges are designed for middle fences to divide fields, a two-sided bank is raised a yard high, and as broad at top, having a slight ditch on each side; and each side of the bank is formed with square spit turfs from the adjoining ground, and the middle filled up with mould from the ditches on each side; so that when finished, it forms a yard-wide border all the way along the top, and along the middle of which plant two rows of hedge-sets or seed, in drills, as before observed. But in places where no ditch nor raised bank is required, as may be the case for middle hedges in the interior parts of grounds, especially in gardens; then the place for the hedge being marked out on the level ground two or three feet broad, dig it along one good spade deep at least, and then plant your sets of any sort in two rows, ranging along the middle; or if you design to sow seeds, &c., of any sort at once, where you intend to have the hedge, sow them in two drills a foot asunder the whole length.

“In respect to the training and general culture of these sorts of hedges it must be remarked, that all such as are exposed to cattle, must as soon as planted be fenced, either with a stake and bush hedge, with burdles, or with rails and open paling, for four or five years, till the hedge grows up, observing not to place the fence too close to the hedge to interrupt its growth. The hedge must also be duly weeded while young, and this should be particularly attended to the first two years. And if designed to train the hedge regularly by clipping it with garden shears, it should be annually performed in summer; observing, however, to top it but sparingly while it is young, until arrived at its intended height: only just trim off the tops of the straggling shoots to preserve a little regularity, and promote lateral wood to thicken it as it advances, and cut it in also moderately on the sides; but when arrived at nearly its proper height of four, five or six feet, or more, then trim it close on the sides and top, annually, to preserve it thick, and within its proper bounds; in cutting the sides always cutting in nearly to the old wood of the former year's cut, otherwise your hedge will get too broad; and keep always the top narrower than the bottom.”

Hedge-shrubs are Evergreen Holly; Yew; Laurel; Laurustinus; Phillyrea; Alaternus; Bay; and Evergreen Oak; but the holly and yew form the best hedges for general use.

Deciduous kinds.—Hawthorn; Blackthorn; Crab; Elder; Hornbeam; Beech; Elm; Lime-tree, and Alder are all proper, either for middling or tall hedges, as they may be trained up from about six or eight to fifteen or twenty feet high, and the elm to double that height if required. Privet is also sometimes used for moderately high hedges; and for low hedges, the Rose; Sweetbriar; Syringa; and Berberry.

All full trained hedges, in order to preserve them in proper form, close and neat, must be clipped, both on the sides and top, once or twice a year, but never less than once; and the best time of the year for this work is summer, from about the middle or latter end of June to the end of August, for then the hedges will have made their summer shoots, which should always, if possible, be clipped the same season while in leaf, and before the shoots become hard, whereby you will be able to perform the work more expeditiously and with greater exactness, for regular hedges should be cut as even as a wall on the sides, and the top as straight as a line; observing, after the hedge is formed to its proper height and width, always to cut each year's clipping nearly to the old of the former year, particularly on the side; for by no means suffer them to grow above a foot or two wide, nor suffer them to advance upon you too much at top, where it is designed or necessary to keep them to a moderate height. But to keep hedges in perfectly good order, they should be clipped twice every summer; the first clipping to be about midsummer, or soon after, when they will have made their summer shoots; and as they will shoot again, what may be called the autumn shoot, the second clipping is necessary towards the middle or latter end of August, and they will not shoot again that year. However, when it does not suit to clip them but once in the summer, the clipping should not be performed until the beginning of August, for if cut sooner they will shoot again, and appear almost as rough the remainder of the summer and all winter as if they had

not been clipped. Very high hedges are both troublesome and expensive to cut. The clipping is sometimes performed by the assistance of a high machine, scaffolding or stage, twenty or thirty feet high or more, having platforms at different heights for the men to stand upon, the whole made to move along upon wheels; it is composed of four long poles for uprights, well framed together, eight or ten feet wide at bottom, narrowing gradually to four or five at top, having a platform or stage at every seven or eight feet high, and one at the top of all; and upon these the man stands to work, each platform having a rail waist high to keep the man from falling; and a sort of a ladder formed on one side for the man to ascend, and at bottom four low wheels to move it along; upon this machine a man may be employed on each stage or platform, trimming the hedge with shears, and sometimes with a garden hedge bill fixed on a handle five or six feet long, which is more expeditious, though it will not make so neat work as cutting with shears.

A hedge is not only an imperfect screen, but in other respects is worse than useless, since nothing can be trained to it, and its roots exhaust the soil in their neighborhood very considerably; as the south fence of a garden it may be employed, and hawthorn is perhaps the worst shrub that could be made use of. It is the nursery of the same aphides, beetles, and caterpillars, that feed upon the foliage of the apple and pear, from whence they spread to the trees nearest the hedge, and finally overrun the whole garden; evergreen are better than deciduous hedges, and more especially the holly, which is not so slow a grower as is generally imagined.

In a cloudy day in April or May, the wind seems to be actually refrigerated in passing through a thick hawthorn hedge, and this may be accounted for on the same principle that cool air is obtained in the houses of India, by sprinkling branches of trees with water in their verandas. Holly, laurel, and most evergreens, exhale but little moisture from their leaves, except for about a month in June, consequently in April and May, when we most require warmth, and in September and October, the leaves of these, when fully exposed to

the sun become heated to the touch to 85° or 90°. Added to this, hoar frost or a deposition of moisture of any kind never attaches so readily or remains for so long a time upon the foliage of evergreens as upon the sprays of deciduous shrubs, consequently the refrigeratory power is greatly diminished. When the garden is of considerable extent, three or four acres and upwards, it admits of cross-walls or fences for an increase of training surface and additional shelter.

Hedges should always be clipped into a conical form, as the diminution of the branches towards the top increases their development at the bottom.

Furze makes one of the best and handsomest of hedges, if kept regularly clipped. Upon the formation of such a hedge, we have the following remarks by Mr. McI. of Hillsborough:—

“The most ancient and perhaps the most simple of all fences are walls made of turf. These walls, however, are much injured by the atmosphere, and the rubbing and butting of the cattle. To guard against this they should be planted or sown with the *Ulex Europæus* or *Furze*. The roots of this plant will soon penetrate the turf, and tend to bind the wall. The plants not only afford shelter as well as food for the cattle, but add to the height of the wall and give it a formidable appearance. When walls are made for this, the foundation should be three feet wide, and tapering to fifteen inches at top. As the plants advance in growth, they should be regularly trimmed with the shears; by proper attention to this they will be prevented from growing too tall and thin at the bottom. If this is annually repeated, the plants will be longer preserved in a healthy and vigorous state; clipping has also a good effect in checking the *furze* from spreading over the field. A good and substantial fence may thus be quickly formed over on a soil that will not produce a biding fence of any other kind.

“*Sweet Briar* (*Rosa Rubiginosa*) makes a good hedge. Its hews may be sown in the autumn, as soon as ripe, or, which is better, in the month of March, having kept them in the mean time mixed with sand. But it is far more convenient to buy for sweet briar layer young plants from the nurserymen, and to plant them a foot apart early in

the month of November. Let them grow as they like the first year, and cut them down to the ground the second, they will then spring up and require no more future care, than occasional trimming with the pruning knife or shears so as to keep the hedge in shape. When it gets naked at the bottom, it must be again cut down."—*Gard. Chron.*

The Laurustinus, Phillyrea, Laurel, Furze, &c., referred to in the foregoing article, are not sufficiently hardy to resist the winter of the middle states, and some of them would, it is presumed, scarcely withstand the sun of the Southern. For ornamental hedges it is safer to rely on the red and white Cedar, Chinese and American Arborvitæ, Juniper, American Holly, Variegated Euonymus, Hemlock Spruce, &c. For purposes of protection the Maclura or Osage Orange is unquestionably the best, wherever it can sustain the winter—which it is able to do so far North as New York. The Buck Thorn (*Rhamnus catharticus*) has been highly recommended, more especially for colder climates. The English method of planting on an elevated bank with ditch on one or both sides, is inapplicable to this country, where excess of moisture is seldom felt: in other respects the mode of treatment detailed in the preceding article may be pursued in this climate.

For an interesting paper on this subject see Downing's "Horticulturist."

HEDWIGIA *balsamifera*. Stove evergreen tree. Cuttings. Sandy loam and peat.

HEDYCHIUM. Twenty-two species. Stove herbaceous. Division. Light rich soil.

HEDYSARUM. Twenty species. Hardy herbaceous. Division or seed. Sandy loam and peat.

HEIMIA. Three species. Half-hardy evergreen shrubs. Cuttings. Sandy loam and peat.

HELENIUM. Eight species. Hardy herbaceous. Division or seed. Common soil.

HELIANTHEMUM. One hundred and twenty-one species. Chiefly hardy and half-hardy shrubs or trailers. Cuttings and seed. Sandy loam and peat.

HELIANTHUS. Thirty-four species. Hardy herbaceous and annual. Seed. Common soil. See *Sunflower* and *Jerusalem Artichoke*.

HELIOCARPUS *americanus*. Stove evergreen shrub. Cuttings. Sandy loam and peat.

HELIOPHILA. Twenty-three species. Hardy annuals and green-house evergreen shrubs. Seeds or cuttings. Sandy loam and peat.

HELIOPSIS. Three species. Hardy herbaceous. Division. Common soil.

HELIOTROPIUM. Seventeen species. Hardy annuals, and green-house evergreen shrubs. Seed or cuttings. Common soil.

The following are good directions for the culture of the Heliotrope:—

"Prepare in August as many shallow thirty-two sized pots as will be required, by filling them to the depth of an inch and a half with broken crocks, upon which a layer of the rough siftings of leaf mould should be laid; the remaining space should be filled with a mixture of finely sifted leaf mould and silver sand, previously well incorporated, which when pressed down firmly, should be exactly level with the border of the pots.

"For cuttings, the tips of the young shoots about three inches in length, should be chosen, and these should be taken off immediately below a joint or the base of a leaf bud.

"After removing two or three of the lower leaves, plant the cuttings in the pots prepared, about an inch and a half deep, and two inches apart; water them well with a fine rose two or three times, so that every part of the soil may be thoroughly moistened, which may easily be known by the water percolating through the bottom of the pots. If this is not attended to, and the surface soil alone is penetrated by the water, certain failure will be the result.

"The cuttings, when planted, should be removed to a cucumber or other frame, where a tolerably damp heat can be supplied; they should be kept shaded from the sun, and air admitted in small quantities, only during the hottest part of the day. In about a fortnight, the plants will begin to form roots, and the shading may be gradually diminished during the morning and afternoon; the quantity of air given them may be increased by degrees, and at the end of a month from the time of planting, the cuttings will be ready for potting off singly.

"For this purpose large sized sixties

are best adapted, and the soil should be composed of equal parts of loam and sandy peat, with small quantities of leaf mould and well decayed manure. The two latter only should be sifted, the loam and peat being left rather rough, and a fair portion of drainage being used, will allow the water to pass off more freely, which is of the greatest consequence during the winter months; the tips of the shoots should also be pinched off to render the plants bushy.

"When potted, they may be taken back to the frame and kept rather close for a few days, until they begin to root into the fresh soil, after which air may be freely admitted to them. About the beginning of October they may be removed to an airy part of the greenhouse, where, if protected from frost, and due attention will be paid to watering, they will survive the winter uninjured."—*Gard. Chron.*

The *Heliotrope* forms an admirable border plant; when plunged or planted out entire, the bloom is produced in inexhaustible profusion throughout the summer, even till the approach of frost; when it may be repotted, and removed to a place of shelter, again to occupy its out door post, on the return of summer weather.

HELLEBORUS. Nine species. Hardy herbaceous. Seed and division. Common soil.

HELLENIA. Three species. Stove herbaceous. Division. Light rich soil.

HELONIAS. Three species. Hardy herbaceous. Division. Moist peat.

HEMEROCALLIS. Five species. Hardy herbaceous. Division. Light loam.

HEMICLIDIA Buxteri. Greenhouse evergreen shrub. Cuttings. Turfy loam, peat, and sand.

HEMIDESMUS indicus. Stove evergreen twiner. Cuttings. Loam and peat.

HEMIMERIS montana. Stove herbaceous. Cuttings. Loam and peat.

HEMIONITIS palmata. Stove fern. Division. Loam and peat.

HEMLOCK. *Comum.*

HEMLOCK SPRUCE. *Pinus canadensis.*

HEN-AND-CHICKENS. See *Daisy.*

HENNA TREE. *Lantana inermis.*

HEPATIC. Four species.

Varieties.—1. Great single Blue. 2. Small Blue. 3. Purple. 4. Lesser

White. 5. Great White. 6. Ash-coloured, or Argential. 7. White with red sinners. 8. Red. 9. Double Purple. 10. Double Blue. 11. Double White. 12. Single Yellow. 13. Peach-coloured. 14. Single Pink.—*Floricul-tural Cabinet.*

They are propagated by division of the roots; and grow best in sandy loam, on a well-drained or open subsoil.

HEPIALUS lugubris. Garden Swift. A moth, of which the caterpillar is more indiscriminate in its attacks upon our plants than is any other ravager of the garden. The roots of *zuriculas*, snowdrops, bear's-ear, parsnips, lettuce, celery, potatoes, and strawberries, have all been observed destroyed by this larva. The moth, usually, is chalky brown, head and thorax woolly, and its upper wings dark bright brown, with a broad line of white; but sometimes this is absent, and at other times the upper wings are chalky white. These moths appear about the end of May, and are very abundant in the evening in meadows and other grassy places. They deposit their eggs apparently without discrimination, which soon hatch, and the caterpillars produced are cylindrical, and yellowish-white, with black dots and hairs on the upper part and sides of their segments. The caterpillar changes to an ochreous, shining cylindrical pupa.—*Gard. Chron.*

HERACANTHA. Four species. Hardy annuals. Seed. Common soil.

HERBACEOUS PLANTS are those perennials which lose their stems annually, whilst the roots continue alive in the earth.

HERBARIUM, or **HERBIS SICCUS;** a dry garden; "an appellation given to a collection of specimens of plants, carefully dried and preserved. The value of such a collection is very evident, since a thousand minutes may be preserved in the well-dried specimens of plants, which the most accurate engraver would have omitted. Specimens ought to be collected when dry, and carried home in a tin box. Plants may be dried by pressing in a box of sand, or with a hot smoothing iron. Each of these has its advantages. If pressure be employed, a botanical press may be procured. The press is made of two smooth boards of hard wood, 18 inches long, 12 broad, and 2 thick. Screws must be fixed in each corner with nuts.

If a press cannot easily be had, books may be employed. Next, some quires of unsized blotting paper must be provided. The specimens, when taken out of the tin box, must be carefully spread on a piece of pasteboard, covered with a single sheet of the paper, quite dry; then three or four sheets of the same paper must be placed above the plant, to imbibe the moisture as it is pressed out. It is then to be put into the press. As many plants as the press will hold may be piled up in this manner. At first, they ought to be pressed gently. After being pressed for about twenty-four hours, the plants ought to be examined, that any leaves or petals which have been folded may be spread out, and dry sheets of paper laid over them. They may now be replaced in the press, and a greater degree of pressure applied. The press ought to stand near a fire, or in the sunshine. After remaining two days in this situation, they should be again examined, and dry sheets of paper be laid over them. The pressure ought then to be considerably increased. After remaining three days longer in the press, the plants may be taken out, and such as are sufficiently dry may be put in a dry sheet of writing paper. Those plants which are succulent may require more pressure, and the blotting paper to be again renewed. Plants which dry very quickly ought to be pressed with considerable force when first put into the press; and, if delicate, the blotting paper should be changed every day. When the stem is woody, it may be thinned with a knife, and, if the flower be thick or globular, as the thistle, one side of it may be cut away, as all that is necessary, in a specimen, is to preserve the character of the class, order, genus, and species. Plants may be dried in a box of sand in a more expeditious manner; and this method preserves the colour of some plants better. The specimens, after being pressed for ten or twelve hours, must be laid within a sheet of blotting paper. The box must contain an inch deep of fine dry sand on which the sheet is to be placed, and then covered with sand an inch thick; another sheet may then be deposited in the same manner, and so on, till the box be full. The box must be placed near a fire for two or three days. Then the sand must be carefully re-

moved, and the plants examined. If not sufficiently dried, they may again be replaced in the same manner for a day or two. In drying plants with a hot smoothing iron, they must be placed within several sheets of blotting paper, and ironed till they become sufficiently dry. This method answers best for drying succulent and mucilaginous plants. When properly dried, the specimens should be placed in sheets of writing paper, and may be slightly fastened by making the top and bottom of the stalk pass through a slip of the paper, cut for the purpose. The name of the genus and species should be written down, the place where it was found, nature of the soil, and the season of the year. These specimens may be collected into genera, orders, and classes, and titled and preserved in a portfolio or cabinet. The method of preserving many of the cryptogamous plants is more difficult, on account of the greater quantity of moisture which they contain, and the greater delicacy of their texture."—*Encyc. Am.*

HERBARY was a department of the garden formerly much more cultivated than at present, when the more potent medicinal plants of hotter climates are so easily procurable. The following is a list of the tenants of the herbary, the appropriate cultivation of which will be found under their particular titles:—

Angelica.	Marigold.
Balm.	Marjoram.
Basil.	Mint.
Blessed Thistle.	Pennyroyal.
Borage.	Peppermint.
Burnet.	Purslane.
Caraway.	Rue.
Chamomile.	Sage.
Chervil.	Savory.
Coriander.	Scurvy Grass.
Dill.	Tansy.
Hyssop.	Tarragon.
Lavender.	Thyme.
Liquorice.	Wormwood.

HERBERTIA *pulchella*. Half-hardy bulb. Seed. Sandy loam and peat.

HERB-GRACE. See *Rue*.

HERCULES-CLUB. *Xanthoxylum clava Herculis*.

HERMANNIA. Forty species. Green-house evergreen shrubs. Cuttings. Light rich soil.

HERMINIUM. Three species. Hardy and half-hardy orchids. Division. Chalk and peat.

HERON'S-BILL. *Erodium*.

HERPESTIS. Three species. Aquatic perennials, stove or hardy. Seed or division. Rich light soil.

HERRERIA. Two species. Stove evergreen twiners. Division. Loam and peat.

HESPERANTHA. Six species. Green-house bulbs. Offsets. Sand, loam, and peat.

HESPERIS. Rocket. Fifteen species, besides varieties. Hardy herbaceous and annual. Division or seed. Rich light soil.

HESPEROSCORDUM. Two species. Hardy bulbs. Offsets. Sandy soil.

HETERANTHERA. Three species. Aquatics, stove, green-house, and hardy. Division. Sandy soil, in water.

HETEROPTERIS. Eight species. Chiefly stove evergreen climbers. Cuttings. Sand, peat, and loam.

HEUCHERA. Nine species. Hardy herbaceous. Division. Light soil.

HIBBERTIA. Ten species. Green-house evergreen shrubs and twiners. Cuttings. Sandy loam and peat.

HIBISCUS. Sixty-nine species, besides varieties. Some annual and biennial, but chiefly perennials, both hardy and tender. Mr. Paxton says, "the shrubby stove and green-house kinds all grow from cuttings, and thrive in loam and peat. *H. syriacus*, from layers or seed, in common soil. The hardy herbaceous kinds require a moist soil."—*Bot. Dict.*

HIDE-BOUND. See *Bark-bound*.

HIERACIUM. One hundred and nineteen species. Chiefly hardy herbaceous. *H. glutinosum* is an annual. Seed in the open soil. The others by division in light soil.

HILLIA. Two species. Stove evergreen shrubs. Cuttings. Turfy loam and sand.

HIPPEASTRUM. Two species. Stove bulbs. Offsets. Turfy loam and peat.

HIPPION. Three species. Green-house biennials. Seed. Light rich soil.

HIPOCREPIS. Nine species. Hardy perennial trailers and annuals. Cuttings or seed. Sandy loam and peat.

HIPPOPHAE. Four species. Hardy trees. Layers or cuttings. Common soil.

HIRÆA. Four species. Stove evergreen climbers. Cuttings. Sandy loam and peat.

HOE. This is the implement which should be most frequently in the gardener's hand, for the surface of the soil can never be too frequently stirred. I entirely agree with Mr. Barnes in thinking the hoe one of the gardener's best friends; and, as it always must be a more frequently used implement than any other, what is the best form of its construction deserves some consideration. The handles should never be made of heavy wood, for this wearies the hand, and is altogether a uselessly heavy weight thrown upon the workman. It is merely the lever, and every ounce needlessly given to this, diminishes, without any necessity, the available moving power. The best woods for handles are birch or deal.

For earthing up plants, broad blades to hoes are very admissible, and they may, without objection, have a breadth of nine inches; but this permission of breadth does not extend to hoes required for loosening the soil and destroying weeds. These should never extend to beyond a breadth of six inches, and the work will be done best by one two inches narrower. The iron plate of which they are formed should be well steeled, and not more than one-sixteenth of an inch thick. The weight necessary should be thrown by the workman's arm and body upon the handle, and the thicker the blade, the greater is the pressure required to make it penetrate the soil. It should be set on the handle at an angle of 65° , as this brings its edge when used at a good cutting angle with the surface of the soil, and the workman soon learns at what point most effectively to throw his weight, and holds the handle further from, or nearer to the blade, accordingly as he is a tall or short man. Mr. Barnes, of Bicton Gardens, whose opinions relative to hoeing I have already quoted, has paid considerable attention to the formation of this implement, and has favoured me with a letter upon the subject, from which I will now give some extracts.

He employs nine sized hoes, the smallest having a blade not more than one-fourth of an inch broad, and the largest ten inches. The smallest are used for potted plants and seed-beds, and those from two inches and a half to four inches wide are used for thinning and hoeing among crops generally.

These have all handles varying in length from eight inches and a half to eighteen inches, all the neck or upper part formed of iron, for the smaller sizes not thicker than a large pencil, and that part which has to be grasped by the workman is only six inches long, and "formed either of willow or some other soft light wood, which is best to the feel of the hand; for hard heavy wood is cumbersome, harsh, and tiring." Each labourer works "with one in each hand, to cut right and left." "The blade is made thin, and with a little foresight and activity it is astonishing how much ground can be got over in a short time."

Mr. Barnes has all his hoes made with a crane neck. The blades broader than four inches Mr. Barnes has made like a Dutch hoe.

"The crane neck allows the blade to pass freely and kindly under the foliage of any crop where the earth requires loosening; and the blade works itself clean, allowing the earth to pass through, as there is no place for it to lodge and clog up as in the old-fashioned hoe, to clean which, when used of a dewy morning, causes the loss of much time in scraping."

"The draw-hoe" is correctly described by Mr. Loudon as a "plate of iron attached to a handle about four feet long, at an angle less than a right angle. The blade is either broad for cutting weeds, deep and strong for drawing earth to the stems of plants, curved, so as to act like a double mould-boarded plough in drawing drills, formed into two strong broad prongs for stirring hard adhesive soils,—or it is formed to accomplish the first and last purposes, as in the double hoe or Dutch hoe.

"The thrust-hoe consists of a plate of iron attached somewhat obliquely to the end of a handle by a bow, used only for killing weeds or loosening ground which is to be afterwards raked. As a man can draw more than he can push, most heavy work will be easiest done by the draw-hoe."—*Enc. Gard.*

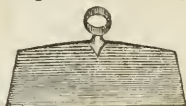
In the island of Guernsey a very effective *weeding-prong* is used, and is thus described in the *Gardener's Chronicle*:—

"It is something in the shape of a hammer, the head flattened into a chisel an inch wide, and the fork the same.

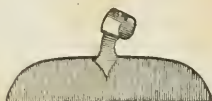
The whole length of this prong is nine inches, and it is attached to a staff five feet long. Such an implement is light and easy to use; it requires no stooping, and will tear up the deepest-rooted weeds."

Hoes are made in a great variety of forms; the following, figured in *The Rural Register*, are those most generally used, and perhaps are all which are truly desirable; they are, when well made, of cast steel.

Square garden Hoe. Fig. 79.



Turnip Hoe. Fig. 80.



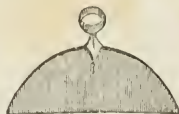
Pronged-back Hoe. Fig. 81.



Forked-back Hoe. Fig. 82.



Half round Hoe. Fig. 83.



Triangle Hoe. Fig. 84.



Dutch or Scuffle Hoe. Fig. 85.



HOITZIA. Three species. Green-house evergreen shrubs. Cuttings. Sandy loam and peat.

HOLLY (*Ilex aquifolium*.) Of this hardy evergreen shrub there are eight varieties:—1, silver-edged; 2, golden-edged; 3, thick-leaved; 4, prickly; 5, yellow-leaved; 6, variegated; 7, spotted; 8, recurvum. It is so desirable, as an ornamental and as a hedge-shrub, that it deserves some more particular notice.

If grown as single ornamental shrubs, they "should not be overshadowed by other trees; and if the land is manured for it so much the better. As to pruning it, with a view to make it grow fast, the less you do of that the better. All that is necessary is to encourage the leader, if necessary, by stopping any laterals that try to interfere with it. In the nurseries, when hollies are stunted and bushy-headed, they are headed down with a view to obtaining a clean straight shoot; but they should not be allowed to become stunted, and then there would be no need to cut them back. In hollies and all other things, stop where necessary; but prune not at all if you can help it."—*Gard. Chron.*

Large plants will bear moving: "if they are shifted in wet weather, as, for example, at the beginning of the July rains, or at any other period when a week or ten days of dull damp weather can be calculated upon, they are certain to succeed. The season least exposed to risk is perhaps the end of autumn, in the dull damp part of October or November; the worst season is the spring."—*Gard. Chron.*

Dr. Lindley says that "the most expeditious way of making *holly-hedges* is to procure large plants from some nursery; but, with the smallest expense and more time, the following may be recommended:—

"Gather a sufficient quantity of berries when ripe; then dig a hole three or four feet deep, and throw the berries in, crushing and mixing them with some fine soil at the same time; close the hole with the soil taken out, and throw some litter, or other covering, over the whole, to prevent the wet or frost penetrating about them in beds. They will make nice little plants the first season; and by transplanting the stronger ones, you will have fine plants in about three years. The holly will not thrive

in any poor light sandy soil, or in a swampy situation, but likes a strong, deep, dry, loamy soil."—*Gard. Chron.*

The best season for clipping hollies is early in spring, before they make their annual growth.

The European Holly does not fully resist the winter of Pennsylvania, unless on well drained land, and further north it is probable it would suffer much more, except in the vicinity of the sea, where many plants do well that are not able to withstand the winter of the same latitude in the interior.

Our own native Holly, (*Ilex opaca*,) is a fine plant too long overlooked.—Why do not persons of taste decorate their grounds with this noble American evergreen, which will grow in any soil, and resist the winter's frost and summer's sun throughout the length and breadth of our continent.

HOLLYHOCK (*Althæa rosea*). There is also a sub-species. *A. R. Biloba*. This flower has lately gained the attention from florists it deserves; and there are now many varieties. Dr. Lindley justly observes that, "the hollyhock is little more than a biennial, and frequently dies suddenly if sown too early in the first season, or if allowed to remain long in the seed-bed before transplanting; therefore the best way to keep them in health is not to sow them before June, and when large enough to transplant them singly where they are to remain and flower in the following season: afterwards cut them down as soon as they have done flowering, and remove them to a fresh situation, where the ground has been well manured, before winter. By continuing this treatment you may keep the same variety for years."—*Gard. Chron.*

HOMERIA. Ten species. Green-house bulbs. Offsets. Loam, peat, and sand.

HONESTY. *Lunaria*,

HONEY-BERRY. *Melicocca*.

HONEY-DEW. See *Extravasated Sap*.

HONEY-FLOWER. *Melanthus*.

HONEY-GARLIC. *Nectaroscordum*.

HONEYSUCKLE. (*Lonicera periclymenum*.) This hardy, beautiful, and fragrant flowering shrub will grow in almost any soil, and will thrive where few others will, under the shade of trees. There are the following sub-species:—

1. *Periclymenum Semper virens*; Perfoliate evergreen; Virginia Honeysuckle, which always flowers, commonly called Trumpet Honeysuckle.

2. *Periclymenum Racemosum*, Honeysuckle with yellowish flowers, growing in bunches, and a snowy fruit.

3. *Periclymenum Verticillatum*, another tree-like honeysuckle, with inflected branches, and a coral-coloured flower.

4. *Periclymenum Germanicum*, the German honeysuckle.

5. *Periclymenum Italianum*, Italian honeysuckle.

6. *Periclymenum Vulgare*, honeysuckle with a corymbus of flower terminating the stalks, hairy leaves, growing distinct, and very slender branches, commonly called English Honeysuckle, or Woodbine.

7. *Periclymenum Americanum*, the evergreen honeysuckle.

As to the general culture, they require very little; the upright sorts in particular, require to have only their straggling shoots shortened, and dead wood cut out; and the trailing kinds, which are trained as climbers, must have their branches conducted in a proper manner upon their respective supports; and every year all rambling shoots must be reduced and trained as you shall see proper, so as to preserve them within due limits; unless you design they shall run wild in their own rural way, especially those intended to climb among the branches of trees, shrubs, and bushes; those also intended and trained annually, laying the shoots along at their length, especially till they have covered the allotted space; shortening or clearing out, however, all such stragglers as cannot be properly trained; likewise such of those sorts as are trained against walls, &c., must have an annual pruning and training, by going over them two or three times in summer, laying in some of the most convenient shoots, some at their length, shortening or trenching others, as it shall seem necessary to preserve regularity, and the proper succession of flowers; observing, however, to train enough, at this time particularly, of such as shall appear necessary to continue the bloom as long as possible; and in winter pruning, thin out all those left in summer which may now appear superfluous, and shorten all such as are

too long for the space allotted for them, especially all those with weak straggling tops; and nail in the remaining branches and shoots close to the wall.

Propagation is effected by layers and cuttings, more particularly the latter, both of which readily emit roots, and form plants in one year, fit to transplant. Some sorts are also propagated by suckers and by seed.

By Layers.—In autumn, winter, or spring, lay a quantity of the lower young shoots of the former summer, shortening their straggling tops; they will be well rooted by the autumn following, each commencing a good plant, and should be taken off, and planted in nursery rows, for a year or two, to acquire proper size and strength for use.

By Cuttings.—Any time from October till March, is the proper time for this work, but the sooner the better, and by which method prodigious quantities of the plants may be raised, as almost every cutting will readily grow.

Choose of the young shoots of the previous summer, the strongest and most robust, which divide into cuttings from about six or eight to ten or fifteen inches long, plant them in rows in any shady border of common earth, a foot asunder, and half that distance apart in each row, or closer if greater quantities are required, putting of each cutting two parts out of three of its length into the ground; they will take root freely, and shoot at top so as to form proper plants by autumn or winter following, at which time they may be transplanted into the nursery quarters to have more room to grow, placing them in rows two feet distance, and a foot apart in the rows, where let them remain a year or two, or till wanted for the shrubbery.

By Seed.—If sowed in autumn in a bed of common mould an inch deep, many of the plants will probably rise in spring; but a great part of them are apt to remain till the second spring before they appear. (*Abercrombie*.)

HONEYWORT. *Cerinth*.

HOOP-PETTICOAT. *Narcissus bulbocodium*.

HOP-HORNBEAM. *Phlogophora*.

HOREHOUND. *Marrubium*.

HORKELLIA. Two species. Hardy herbaceous. Seed and division. Common soil.

HORNINUM *pyrenaicum*. Hardy

herbaceous. Seed and division. Common soil.

HORN. See *Animal Matters*.

HORNBEAM. *Carpinus*.

HORN-OF-PLenty. *Fedia*.

HORN-POPPY. *Glaucium*.

HORSE-CHESTNUT. *Æsculus*.

There are the following species and varieties:—

Æ. Hippocastanum. Common horse-chestnut. Asia. Seeds sown in March. Flowers in May. Height forty feet.

Æ. H. folia aurea. Gold-striped horse-chestnut.

Æ. H. folia argentea. Silver-striped horse-chestnut.

These two varieties have the same characteristics as the preceding, but are propagated by grafting in March.

Æ. flava. Yellow horse-chestnut.

Æ. parva. Scarlet horse-chestnut.

Æ. parva rosea. Pale scarlet horse-chestnut.

All natives of Carolina. June. Grafts. Twenty feet.

Horse-chestnuts all require a light, rich, well-drained soil, and a sheltered situation, being much injured by violent winds. When in blossom they are strikingly beautiful, and their round heads group well with trees having more pointed forms. They may all be grafted on the common horse-chestnut, which is increased by seed or layers.

HORSE-CHESTNUT MOTH. See *Bombyx*.

HORSE-RADISH. *Cochlearia Armoracia*. Delights in a deep, mouldy, rich soil, kept as much as possible in a moderate but regular degree of moistness. Hence the banks of a ditch, or other place which has a constant supply of water, is a most eligible situation for the beds, so that they do not lie so low as to have it in excess. If the soil is poor, or beneath the drip of trees, the roots never attain any considerable size.

Manures.—Should the ground require to be enriched, leaf-mould, or other thoroughly decayed vegetable substance, should be dug into the depth at which the sets are intended to be planted. If cow or horse-dung be employed, it should be in a highly putrescent state.

Propagation.—Horse-radish flowers in June, but in this climate seldom perfects its seed, consequently it is propagated by sets, which are provided by cutting the main root and offsets into lengths of two inches. The tops, or

crowns of the roots, form the best; those taken from the centre never becoming so soon fit for use, or of so fine a growth. If the latter are, however, unavoidably employed, each set should have at least two eyes; for without one they refuse to vegetate at all. For the obtaining a supply of the crowns, any inferior piece of ground, planted with sets six inches apart and six deep, will furnish from one to five tops each, and may be collected for several successive years with little more trouble than keeping them clear of weeds; but the times for planting are in October and February—the first for dry soils, the latter season for moist ones.

The sets are inserted in rows eighteen inches apart each way. The ground should be trenched between two and three feet deep, the cuttings being placed along the bottom of the trench, and the mould turned from the next one over them, or inserted to a similar depth by a long blunt-pointed dibble. They should be placed in their natural position, which has considerable influence over the forwardness of their growth; the surface raked level, and kept clear of weeds until the plants are of such size as to render it unnecessary. The mould ought to lie as light as possible over the sets; therefore, treading on the beds should be carefully avoided. The shoots make their appearance in May or June, or even earlier if they were planted in autumn.

As the leaves decay in autumn, have them carefully removed; the ground being also hoed and raked over at the same season, which may be repeated in the following spring before they begin to vegetate, at which time eighteen inches depth of mould to be laid regularly and lightly over the bed.

In the succeeding autumn they merely require to be hoed as before, and may be taken up as wanted. By having three beds devoted to this root, one will always be lying fallow and improving; of which period likewise advantage should be taken to apply any requisite manure.

If, when of advanced growth, the plants throw out suckers, these should be carefully removed, during the summer, as they appear.

In September or October of the second year, as before stated, the roots may be taken up; and in November a

sufficient quantity should be raised to preserve in sand for winter supply.

Taking up. — To take them up a trench is dug along the outside row down to the bottom of the upright roots, which, by some persons, when the bed is continued in one place, are cut off level to the original stool, and the earth from the next row is then turned over them to the requisite depth; and so in rotation to the end of the plantation. By this mode a bed will continue in perfection for five or six years; after which a fresh plantation is usually necessary. But the best practice is to take the crop up entirely, and to form a plantation annually; for it not only causes the roots to be finer, but also affords the opportunity of changing the site. If this mode is followed care must be taken to raise every lateral root; for almost the smallest of them will vegetate, if left in the ground.

HORSE-RADISH TREE. *Moringa*.

HORSE-THISTLE. *Cirsium*.

HORTICULTURE (from *hortus*, garden, and *colo*, I till) includes in its most extensive signification, the cultivation of esculent vegetables, fruits and ornamental plants, and the formation and management of rural scenery for the purposes of utility and embellishment. The earliest effort of man to emerge from a state of barbarism was directed to the tillage of the earth: the first seed which he planted was the first act of civilization, and gardening was the first step in the career of refinement; but still it is an art in which he last reaches perfection. When the savage exchanges the wild and wandering life of a warrior and hunter, for the confined and peaceful pursuits of a planter, the harvests, herds, and flocks take the place of the simple garden. The mechanic arts are next developed; then commerce commences, and manufactures soon succeed. As wealth increases, ambition manifests itself in the splendor of apparel, of mansions, equipages and entertainments. Science, literature, and the fine arts are unfolded, and a high degree of civilization is attained. It is not until all this has taken place, that horticulture is cultivated as one of the ornamental arts. Egypt, the cradle of civilization, so far perfected her tillage, that the banks of the Nile were adorned by a succession of luxuriant plantations, from the cata-

ract of Syene to the shores of the Delta; but it was when Thebes with its hundred brazen gates, and the cities of Memphis and Heliopolis, were rising in magnificence, and her stupendous pyramids, obelisks, and temples, became the wonders of the world. The hills and plains of Palestine were celebrated for beautiful gardens; but it was not until the walls and temple of Jerusalem announced the power and intelligence of the Israelites, and the prophets had rebuked their luxury and extravagance. The queen of the East "had heard of the fame of Solomon;" his fleets had brought him the gold of Ophir, and the treasures of Asia and Africa; the kings of Tyre and Arabia were his tributaries, and princes his merchants, when he "made orchards," "delighted to dwell in gardens," and planted the "vineyard of Baalhaman." The Assyrians had peopled the borders of the Tigris and Euphrates, from the Persian gulf to the mountainous regions of Ararat, and their monarchs had founded Nineveh and Babylon, before we hear of the gardens of Semiramis. The Persian empire had extended from the Indus to the Archipelago, when the paradise of Sardis excited the astonishment of a Spartan general, and Cyrus mustered the Grecian auxiliaries in the spacious garden of Celæux. The Greeks had repulsed the invasions of Darius and Xerxes, and Athens had reached the height of her glory, when Cimon established the Academus, and presented it to his fellow citizens as a public garden. Numerous others were soon planted, and decorated with temples, porticoes, altars, statues and triumphal monuments; but this was during the polished age of Pericles, when Socrates and Plato taught philosophy in the sacred groves; when the theatre was thronged to listen to the poetry of Euripides and Aristophanes; when the genius of Phidias was displayed in rearing the Parthenon and sculpturing the statues of the gods; when eloquence and painting had reached perfection, and history was illustrated by Herodotus, Thucydides, and Xenophon. Rome had subjugated the world, and emulated Athens in literature, science, and the arts, when the superb villas of Sallust, Crassus, Pompey, Cæsar, Mæcenas and Agrippina were erected, and the palaces of the emperors were environed

by magnificent gardens. The history of modern nations presents similar results. Horticulture long lingered in the rear of other pursuits. Most of the common fruits, flowers and oleraceous vegetables which had been collected by the Greeks and Romans, from Egypt, Asia and other distant climes, were successively extended over Western Europe; but so gradual was their progress, after the dark ages, that, till the reign of Henry VIII., scarcely any kitchen vegetables were cultivated in England, and the small quantity consumed was imported from Holland. Fuller observes, that "gardening was first brought into England, for profit, about the commencement of the 17th century. Peaches, nectarines, apricots, plums, pears, cherries, strawberries, melons, and grapes, were luxuries but little enjoyed before the time of Charles II., who introduced French gardening at Hampton court, Carlton and Marlborough, and built the first hot and ice houses. At this period Evelyn translated the "Complete Gardener," and a treatise on orange trees, by Quintinyne; and, having devoted the remainder of his life to the cultivation of his rural seat at Sayes court, near Deptford, and the publication of his *Sylva*, *Terra*, *Pomona*, and *Acetaria*, he "first taught gardening to speak proper English." In the Netherlands, France, Germany, and Italy, a formal and very imperfect system of gardening was practised with considerable success; but it was generally in a languishing condition, throughout the world, until the commencement of the 18th century, when it attracted the attention of some of the first characters of Great Britain; but the establishment of the present improved style of horticulture is of very recent date. "Bacon was the prophet, Milton the herald, and Addison, Pope and Kent the champions of true taste." The principles which were developed in their writings, and those of Shenstone, the Masons, and Wheatley, were successfully applied by Bridgeman, Wright, Brown, and Eames; the system soon became popular, and gradually extended over Europe, and ultimately reached the United States. But the labours of the London Horticultural Society have mainly contributed to the perfection and present high estimation of gardening. That noble institution has given an im-

petus to cultivation, which is felt in the remotest countries. Its example has been followed in the most flourishing kingdoms of the eastern continent, and many similar institutions have been founded in the United States. The effect of these is to diffuse through every country the knowledge and products of all. The history, literature and science of gardening, open a wide field for study and inquiry. The pleasure which gardens afforded men, even in the earliest times, appears from the scriptural account of the garden of Eden. The garden of Gethsemane, and that of the good and just Arimathean, are memorable in the sacred history of the Messiah. The Elysian fields were the heaven of classic mythology, and the devout Mussulman hopes to renew his existence in a celestial paradise. The bards, scholars and philosophers of the classic ages, have transmitted descriptions of the gardens of the ancients, from those in which Homer places the palace of Alcinous and the cottage of Lærtēs, to the splendid villas of Pliny and Lucullus. Among the ancient Greek writers, Hesiod, Theophrastus, Xenophon and Ælian treated of gardens to a certain extent; and the works of those who wrote after the seat of government was removed to Constantinople were collected under the title of *Geoponica*, and have been translated by Owen. Among the Latins, Varro was the first author, to whom succeeded Cato, Pliny the Elder, Columella and Palladius. Passages are to be found, relative to the subject, in Martial, Virgil and Horace; but Pliny's Natural History, and Columella's book on gardens, contain the most correct information on Roman horticulture. Literature and the arts having revived in Italy, that country was the first to produce books on agriculture and gardening, and that of Crescenzia became celebrated. The field and garden cultures of Italy are so nearly allied, and horticulture and agriculture have been so blended by the writers, that it is difficult to ascertain under which department to include their works. The best for general information on the tillage of that delightful region is the *Annali dell' Agricoltura*. The Germans, as in all the branches of letters, science, and arts, have an immense number of books in the department of gardening, especially on the

subject of planting and forest trees. Those which furnish the best idea of the state of culture in that country, are Dietrich's *Wörterbuch*, with the supplement of 1820, and Sickler's *Deutsche Handwirthschaft*. The Dutch excel more in the practice than the literature of gardening. They have no work of very recent date; that of Comelin, which was published about the middle of the 17th century, is among the earliest; and those of La Court and Van Osten are said to be among the best that have appeared. The Journal of a Horticultural Tour in Holland and Flanders, by a deputation of the Caledonian Horticultural Society, gives the most satisfactory account of gardening in that part of the continent, in 1817. The Transactions of the Stockholm and Upsal academies furnish the chief information which is to be obtained, in relation to the rural economy of Sweden. The first author was Rudbeck, who was a cotemporary of Commelin. Russia and Poland have produced but very few original books on horticulture. The Agricultural Transactions occasionally published by a society in Warsaw, with those of the Economical Society of St. Petersburg, may be considered as affording the most accurate intelligence as to the culture of those countries. In the latter city is an extensive imperial botanical garden, which being under the direction of able professors, emulates those of the more favoured portions of southern Europe. The only recorded source for obtaining any knowledge of Russian tillage, are the Transactions of the Royal Agricultural Society of Madrid. The horticultural literature of France is of an early date, and the authors are not only numerous, but many of them in the highest repute. Etienne and Belon were the pioneers, while Du Hamel, Girardin, D'Argenville, Rossier, Tessier, Calvel, Noisette, Du Petit Thours, Jean and Gabriel Thouin, Bosc and Vicomte Haricart de Thury, may be considered as among the most able of their followers, in the various branches of rural economy. For a general knowledge of French culture, the *Nouveau Cours d'Agriculture*, in thirteen volumes, published in 1810, should be consulted; but the most valuable publications on the existing mode of gardening, are the monthly *Annales de la Société d'Horticulture*,

the *Annales de l'Institut Royal Horticole de Framont*, and the *Bon Jardinier*, an annual publication compiled by professor Poiteau and Vilmorin. The first English treatise on rural economy was Fitzherbert's Book of Husbandry, which was published in 1634. The works of Tusser, George and Platt soon after appeared, and, early in the 18th century, the celebrated treatise of Jethro Tull excited much attention; and several new works of considerable merit were announced before 1764, when the valuable publications of Arthur Young, Marshal, and numerous other authors, spread a knowledge of cultivation, and cherished a taste for rural improvements, throughout Great Britain. The literature of horticulture rapidly advanced; but as many of the most eminent writers have been named, in treating of the science and art of gardening, it is unnecessary to mention them in this place. The citizens of the United States have been chiefly dependent on England for books relating to agriculture and gardening. Still several have appeared by native writers, which are highly creditable to the authors and the country; especially those which relate to the botanical department. Muhlenburg, Bigelow, Eliot, Torrey, Colden, Bartram, Barton, Hosack, Mitchel, Darlington, Ives, Dewey and Hitchcock, are entitled to great praise for their successful attempts to illustrate the American flora. One of the earliest writers on husbandry was Belgrave, who published a treatise on husbandry, in Boston, in 1755; and in 1790 Deane's New England Farmer appeared; but McMahon, Cox, Thacher, Adlam, Prince, Buntly, Butler, Nicholson and Fessenden, since the commencement of the present century, have produced works on the various cultures of the United States, which are generally circulated, and held in great estimation. The scientific relations of horticulture are numerous, and require an extensive acquaintance with the various branches of natural history and physics. Botany, mineralogy, chemistry, hydraulics, architecture and mechanics must furnish their several contributions, which it is the province of the artist to apply. After the illustrious Linnæus published his system of Nature, botany became a popular science, and a variety of interesting elementary works awakened

attention to the beauties of nature, and a passion for experimental and ornamental planting was induced, which has been productive of great results. Mineralogy enables us to obtain accurate knowledge of terrestrial substances, and the mode of distinguishing the divers kinds of earths, which constitute a cultivable soil ; and chemistry instructs us as to the nature and properties of these various earths, having for its objects, when applied to horticulture, all those changes in the arrangements of matter, which are connected with the growth and nourishment of plants, the comparative value of their produce as food, the constitution of soils, the manner in which lands are enriched by manure, or rendered fertile by the different processes of cultivation. Inquiries of such a nature cannot but be interesting and important, both to the theoretical horticulturist and the practical gardener. To the first they are necessary in applying most of the fundamental principles on which the theory of the art depends. To the second they are useful in affording simple and easy experiments for directing his labours, and for enabling him to pursue a certain and systematic plan of improvement. To hydraulics belong, not only the conducting and raising of water with the construction of pumps and other engines for those purposes, but the laws which explain the nature of springs and fountains. By the principles of that science, artificial lakes, canals and aqueducts are formed, irrigations projected, and water rendered subservient to the useful purposes of life, as well as to the embellishments of pleasure-grounds by *jets d'eau*, cascades and streams. Architecture, as a branch of horticulture, is of the first importance. Without its aid, it would be impossible to give that propriety and elegance to the scenery, and to produce that pleasing effect, which is the chief object of landscape gardening. Mechanics, in all its branches, is required for the purposes of horticulture. Great improvements have been effected in gardening within the last half century. During the age of Cicero, a formal kind of gardening prevailed, characterized by clipped hedges and long avenues of trees. Pliny the Younger has given an account of his villa at Laurentum, and from the description, it was rather distinguished

for its numerous superb edifices, extensive prospects, and the systematical arrangement of the pleasure grounds, than for the improvements and decorations of the surrounding scenery, in accordance with those principles which are derived from a close observance of the pleasing effects of nature. The rural residences of the Romans appear to have been mere places of temporary retreat, and were planted with odoriferous flowers and shrubs and ornamented rather by the civil architect than the horticultural artist. From the establishment of the papal government to the commencement of the 13th century, the monks were the only class of persons who attended to ornamental gardening. After that period, the style prevalent throughout Europe consisted in tall hedges, square parterres fantastically planted, straight walks, and rows of trees uniformly placed and pruned. In fact, but little improvement was made from the time of the emperors Vespasian and Titus until the reign of George III. of England. It is true, Hampton Court had been laid out by Cardinal Wolsey ; Le Nôtre had planted Greenwich and St. James's Park during the reign of Charles II. ; and, in that of George II., Queen Caroline had enlarged Kensington Gardens, and formed the Serpentine river ; but Lord Bathurst was the first who deviated from straight lines, as applied to ornamental pieces of water, by following the natural courses of a valley. Still, what has been emphatically called the *Dutch system* universally prevailed, and the shearing of yew, box and holly into formal figures of various kinds, and the shaving of river banks into regular slopes, went on until their absurdity became contemptible, and a better and more natural taste was induced. Verdant sculpture, regular precision in the distribution of compartments and rectangular boundary walls, yielded to more chaste designs. Bridgeman succeeded to Loudon (not the distinguished author) and Wise, and became a distinguished artist ; he rejected many of the absurd notions of his predecessors, and enlarged the bounds of horticulture. Other innovators departed from the rigid rules of symmetry ; but it was reserved for Kent to realize the beautiful descriptions of the poets, and carry the ideas of Milton, Pope, Addison and Mason more extensively

into execution. According to Lord Walpole, he was painter enough to taste the charms of landscape, sufficiently bold and opinionative to dare and to dictate, and born with a genius to strike out a great system from the twilight of imperfect essays. He leaped the fence, and saw that all nature was a garden. The great principles on which he worked were perspective, light and shade. Groups of trees broke a too extensive lawn; evergreens and wood were opposed to the glare of the champaign, and, by selecting favourite objects, and veiling deformities, he realized the compositions of the great masters in painting. Where objects were wanting to animate his horizon, his taste as an architect could immediately produce them. His buildings, his temples, his seats, were more the work of his pencil than of his science as a constructor. He bade adieu to all the stiff modes of canals, circular basins, and cascades tumbling over marble steps. Dealing in none but the true colours of nature, and seizing upon its most interesting features, a new creation was gradually presented. The living landscape was chastened or polished, not transformed. The elegant works of Repton, the unrivalled essays of Price on the picturesque, and the valuable publications of Gilpin, Madox, Panton, Sang and Loudon, with those of many other writers on landscape and ornamental gardening, have had an extensive influence in promoting correct ideas of natural scenery. The improved style of horticulture, every where apparent in Great Britain, attracted the attention of the other nations of Europe, and English gardening became the designation for all that was beautiful in that pleasing art—the synonyme of perfection in rural culture. At the period when this new system of laying out ground was gaining converts, and began to be practically adopted, Viscount Girardin, a French military officer of high rank, travelled through England, and, on his return, he not only improved his seat at Ermenonville in conformity to that style, but published a work of great celebrity on the *Composition des Paysages sur le Terrain, ou des Moyens d'embellir la Nature près des Habitations*. The French style of laying out gardens had been settled by Le Nôtre, during the reign of Louis XIV., and

continued in repute for upwards of a century; for it appears to have been in vogue as late as 1770. The court and nation wished to be dazzled by novelty and singularity, and his long, clipped alleys, triumphal arches, richly decorated parterres, his fountains and cascades, with their grotesque and strange ornaments, his groves full of architecture and gilt trellises, and his profusion of statues, enchanted every class of observers. His principal works were the gardens of Versailles, Meudon, St. Cloud, Sceaux, Chantilly, and the terrace of St. Germain. Gray, the poet, was struck with their splendor when filled with company, and when the water-works were in full action; but Lord Kaimes says, they would tempt one to believe, that nature was below the notice of a great monarch. Le Nôtre was succeeded by Dufresny, who, differing considerably in taste from that great artist, determined on inventing a more picturesque style; but his efforts were rarely carried into full execution. He, however, constructed in a manner superior to his predecessor, the gardens of Abbé Pajot and those of Moulin and Chemin creux. After the peace of 1762, the English system began to pass into France, and portions of ancient gardens were destroyed, to make way for young plantations *à l'Anglaise*. Laugier was the first author who espoused the English style, and the next in order was Prevot. It was at this time that Viscount Girardin commenced his improvements at Ermenonville, and the change of the horticultural taste in France, may be referred to the last quarter of the 18th century. The English style has gradually found its way into most civilized countries. Only 25 years have elapsed since the London Horticultural Society was established, and there are now more than 50 similar institutions in Great Britain, which still maintains the first rank in the art; but France is making great efforts to rival her. A horticultural society was established in Paris in 1826, and has already more than two thousand members, and the number is rapidly increasing. It has been patronised by the court, and most of the nobles and men of distinction in France have eagerly united with the proprietors of estates and practical cultivators to collect and disseminate intelligence throughout that flourishing empire. In the various

provinces where horticultural societies have not been founded, those of agriculture, or of the sciences and arts, have established departments expressly devoted to that interesting pursuit; and during the year 1827, a practical and theoretical institution was founded at Fromont, by the enlightened and munificent Chevalier Soulange Bodin, for educating gardeners, and introducing improvements in every department of horticulture. The garden contains about 130 acres, and is divided into compartments for every variety of culture. Extensive green-houses, stoves and orangeries have been erected, and all the other appendages furnished, which are requisite for rendering the establishment effectual for instruction and experiment. The nursery of the Luxembourg long supplied a great part of Europe with fruit trees. The *Jardin des Plantes*, in Paris, includes compartments, which may be considered as schools for horticulture, planting, agriculture, medical botany and general economy, and is unquestionably the most scientific and best managed establishment in Europe. The flower garden of Malmaison, the botanical garden of Trianon, and numerous nursery, herb, medicinal, experimental and botanical gardens, in various parts of the kingdom, are pre-eminent for the variety, number and excellence of their products. Holland has been distinguished, since the period of the crusades, for her flower gardens, culinary vegetables, and plantations of fruit trees. The north of Europe and the United States are still dependent upon her florists for the most splendid varieties of bulbous-rooted plants; and her celebrated nurseries, which have long replenished those of Europe, have been recently fortunate in the acquisition of Van Mons and Duquesne. Some of the finest fruits of our gardens were produced by these indefatigable experimentalists, and, with the excellent varieties created by Knight, promise to replace those which have either become extinct, or are so deteriorated in quality, as to discourage their cultivation. From St. Petersburg to the shores of the Mediterranean, horticulture has made a rapid progress, and each nation is emulous to perfect its culture, in accordance with the most improved principles of science, art and taste. In

the United States, a like spirit has been more recently developed. Horticultural societies have been instituted in New York, Philadelphia, Boston, Albany, Geneva, and South Carolina, and a zealous disposition evinced to compete with the nations of the eastern continent. The environs of many of the cities are in a high state of cultivation, and the markets are beginning to be well stocked with numerous varieties of fruits and vegetables. It is now the duty of American cultivators to reciprocate the benefits which they have so long received from their transatlantic brethren, and to develop the resources of a country, which offers such an extensive range of research to the naturalist. Many of the most useful and magnificent acquisitions of the groves, fields, gardens and conservatories of Europe are natives of the western hemisphere. The indigenous forest trees, ornamental shrubs, flowers, fruits, and edible vegetables of North America, are remarkable for their variety, size, splendour or value. Extending from the pole to the tropics, and from the Atlantic to the Pacific, North America embraces every clime, and every variety of soil, teeming with innumerable specimens of the vegetable kingdom. With such advantages, most of which are included within the United States, it is to be expected that the citizens will be as distinguished for their advancement in rural economy as in civil and religious freedom. The natural divisions of horticulture are the esculent or kitchen garden, seminary, nursery, fruit trees, and vines, flower garden, green-houses, *arboretum* of ornamental trees and shrubs, the botanical and medical garden, and landscape or picturesque gardening. Each of these departments requires to be separately studied before it can be managed so as to combine utility and comfort with ornament and recreation. To accomplish this on a large scale, artists, scientific professors, and intelligent and experienced practical superintendents, are employed in Europe, but they have not as yet been much required in the United States. The owners of the soil have generally designed and executed such improvements as have been made in the conveniences and embellishments of country residences. The kitchen garden is an indispensable appendage

to every rural establishment. In its simplest form, it is the nucleus of all others. Containing small compartments for the culture of esculent vegetables, fruits and ornamental plants, these may be gradually extended, until the whole estate assumes the imposing aspect of picturesque or landscape scenery. The details of the several grand divisions of horticulture are to be learned from the numerous authors who have devoted their especial attention to each, and those which have been named, with many others, should be consulted by every gentleman who wishes to participate in the comforts and luxuries of a garden. The most valuable and interesting branches of gardening to the citizens of the United States, generally, are of course those which include the culture of esculent vegetables, fruits and ornamental plants. These may be enjoyed, in various degrees, by all the proprietors of the soil. It is only necessary that information should be disseminated, and examples presented by the more intelligent and opulent, to remove the too common prejudice, that gardens are costly and useless appendages, requiring great expenditure and labour, without any adequate profit or satisfaction. So far from this, there is not a farmer, not an owner of an acre of land, who will not be enriched or gratified by devoting a portion of his industry to the tillage of a garden: they may find many hours which can be thus profitably and pleasantly employed. Personal attention, with judicious arrangements, and a proper division of labour, will accomplish much. Many of the most valuable products of agriculture were first introduced, and their qualities tested, in the garden. "If, therefore," says the learned and eloquent Poiteau, "we would ascend to the origin of Agriculture, it is in the garden that her cradle will be found. There, like the young Hercules, she first tried her powers, and prepared, like him, to overrun the world, which she speedily cleared of monsters, and bestowed upon man the laws of civilization." Although commendable efforts have been made, in several parts of the country, to introduce and multiply all kinds of esculent vegetables, most of the choice varieties of fruits, and many of the ornamental trees and plants, still there is a general and la-

mentable negligence of this delightful culture. In England, the eye is continually struck with cottages embowered amidst fruit trees, shrubs and flowers, while a neat compartment of esculent vegetables supplies much of the food for the support of the inmates. In Germany, Holland, and a portion of Italy, it is the general attention which all ranks bestow upon the grounds surrounding their habitations, that gives such a pleasing aspect to those countries. But little attention has been paid in the United States to the planting of forest trees, ornamental shrubs and flowers, although the native varieties are numerous, highly valued in other countries, and constitute the most interesting exhibitions in those celebrated establishments, which are enriched by collections from all quarters of the globe. Arboriculture claims attention, not merely for the purposes of rural embellishment, but to replace the valuable timber trees, which are fast disappearing throughout the Atlantic states. The forest trees of North America exceed 140, while in Europe there are only 37. There are 53 species of the oak, 17 of the pine, 15 of the walnut, and 8 of the maple. Of those magnificent trees which compose the genus of the *magnolia*, but 15 are known, 9 of which belong to the United States. In all ages and countries, flowers have been universally cherished. "Who," asks Boursault, "does not love flowers? They embellish our gardens; they give a more brilliant lustre to our festivals; they are the interpreters of our affections; they are the testimonials of our gratitude; we present them to those to whom we are under obligations; they are often necessary to the pomp of our religious ceremonies, and they seem to associate and mingle their perfumes, with the purity of our prayers, and the homage which we address to the Almighty. Happy are those who love and cultivate them." The ancients paid particular attention to flowers. They were in great request at the entertainments of the wealthy; they were scattered before the triumphal chariots of conquerors; they formed the distinguishing insignia of many divinities; they glitter as gems in the diadem of the seasons, and constitute the mystical language of poetry. We are told that Descartes prosecuted, with equal

ardour, astronomy and the culture of flowers. The great Condé devoted his leisure hours to that delightful pursuit, and the vase of flowers was daily renewed upon the table of Lord Bacon, while composing the volumes of his sublime philosophy. In the cities of Europe, flower-markets, for the sale of bouquets and ornamental plants, are as common as those for fruits. In this new world, these delicate daughters of the sun have not received that attention which indicates the highest state of civilization: but a taste for floriculture is increasing throughout the Union, and ornamental plants embellish the country seats of the opulent and the dwellings of honest industry. Botanical gardens have been established in several of the states, and the large cities can now boast of their marts and exhibitions of flowers. One of the greatest impediments to the progress of horticulture in the United States has been the deficiency of nurseries, both as to number and extent. They are not only requisite for furnishing the various kinds of trees and plants which are demanded for utility and embellishment, but to give publicity to the most valuable and interesting species, as well as to excite a taste for their cultivation. These establishments, however, have been much increased and improved within a few years, and there are several in the vicinity of Boston, New York, Albany, Philadelphia, and in the district of Columbia, which are highly creditable to the proprietors and to the country."—*Encyc. Am.*

HOSACKIA. Four species. Hardy herbaceous. Division and seed. Common soil.

HOSE-IN-HOSE is a form of double flowers, when one corolla is inserted within the other, as is frequently the case with the primrose.

HOSTA. Three species. Stove evergreen shrubs. Cuttings. Peat and loam.

HOT-BED. When a temperature of 45°, moisture, and atmospheric air occur to deaden vegetable matters, these absorb large quantities of oxygen, evolving also an equal volume of carbonic acid. As in all other instances where vegetable substances absorb oxygen gas in large quantities, much heat is evolved by them when putrefying; and advantage is taken of this by employing leaves, stable-litter, and tan, as sources

of heat, or hot-beds, in the gardener's forcing department.

A hot-bed is usually made of stable-dung, of which that made by the best fed horses is to be preferred. It should be about ten days from the stalls, and without too large a proportion of litter. After being thrown into a heap, of conic form, for five or six days, it must be so turned over, that the inner parts are brought to the outside, the clots well separated with the fork, the heap being re-formed conically as before, and left for an equal number of days. By this time and treatment the dung in general acquires a sufficient and steady heat; if, however, it is very dry and fresh, it must be moderately moistened, and left for five or six days more. At the time of forming the heap, as well as at every turning, water should be applied if its substance appears at all dry, as a regular state of moisture is of first importance to the obtaining a favourable fermentation. It should remain until the straw in general assumes a dark brown colour, when it should be immediately formed into the bed. Leaves or tan may be mixed with advantage, as heat is thereby generated during a greater length of time. In cold, wet, or boisterous weather, the heaps should be covered to a moderate depth with litter.

In making the beds, they must be so situated as to be entirely free from the overshadowing of trees, buildings, &c., and having an aspect rather a point eastward of the south. A reed fence surrounding them on all sides is a shelter that prevents any reverberation of the wind, an evil which is caused by paling or other solid inclosure. This must be ten feet high to the northward or back part, of a similar height at the side, but in front only six. The wicket or gate must be of sufficient width to admit a loaded wheelbarrow. An inclosure of this description, one hundred feet in length and sixty broad, will be of a size sufficiently large for the pursuit of every description of hot-bed forcing. But for cucumbers, melons, and a few inferior articles, a space for six or eight lights is sufficient. Fruit may be forced slightly by being trained within it on the southern aspect; the fence on that side in that case must be of brick or wood.

To prevent unnecessary labour, this

inclosure should be formed as near to the stable as possible. For the reception of the bed, a trench is often dug of its determined length and breadth, and six inches deep, if the soil is wet, or eighteen or more if it is dry. In a dry soil and climate this cannot be productive of much injury, but otherwise it almost always chills the bed: at the same time it is to be observed, that it is never productive of benefit, further than not being so high; it is easier of access, but gives much additional trouble, both at the time of founding and afterwards, when linings are to be applied.

The site of the bed being determined, a stake should be driven perpendicularly at the four corners as a guide for its rectangular construction. The dung must be thoroughly mixed just before it is used, and as carefully separated and spread regularly with the fork, as the bed is formed with it. It is beneficially settled down in every part alike by beating with the fork as the work proceeds, rather than by treading; for if too much compressed, a high degree of heat is generated but is soon spent: a contrary phenomenon is often caused if trod to a still greater excess, namely, that no heat at all is engendered.

The longest or littery part of the dung should be laid at the bottom of the bed, and the finer fragments of the dung upon the top. If it is not regularly and moderately moist throughout, it should be sprinkled over with water. As the surface on which the bed is founded is usually horizontal, so is the dung laid perfectly parallel with it. Mr. Knight recommends it, on the contrary, to be equally inclined with its foundation, that it may associate well with the new form, which he recommends for frames. See *Frame*.

The breadth of a bed must always be five feet, and in the depth of winter four and a half feet high when firmly settled; to form it of this size, about twelve barrow loads of dung are required to a light.

In early spring, a height of three and a half feet is sufficient, and as the season advances, it may decline to three or two and a half feet. In May or early summer, when the only object is to hasten the germination of seeds, two feet or eighteen inches is not less than the necessary height. The length of

the bed in all cases must be guided by the size of the frame.

To prevent the sudden changes of temperature in the external air affecting the heat of the bed, coat the sides of the bed with sand; coal-ashes or earth might be substituted, to a thickness of two feet.

As the heat declines, linings, or as they might be more properly called, coatings, are made use of, which consist of hot fermenting dung laid from eighteen to twenty-four inches, in proportion to the coldness of the season, &c., all round the bed to the whole of its height, and if founded in a trench, one equally deep must be dug for the coating, it being of importance to renew the heat as much as possible throughout its whole mass; if, after a while, the temperature again declines, the old coating must be taken away, and a similar one of hot dung applied in its place. As the spring advances, the warmth of the sun will compensate for the decline of that of the bed; but as the nights are generally yet cold, either a moderate coating, about nine or ten inches thick, is required, or the mowings of grass, or even litter, may be laid round the sides with advantage.

The depth of earth, as well as the time and manner of applying, vary considerably; it should never be put on until four or five days after the bed is formed: before it is applied, the edges of the bed should be raised full eight inches higher than the middle, as from the additional weight of the frame they are sure to sink more and quicker, thereby often causing the earth to crack and injure the roots of the plants.

The roots of plants being liable to injury from an excessive heat in the bed, several plans have been devised to prevent this effect. If the plants in pots are plunged in the earth of the bed, they may be raised an inch or two from the bottom of the holes they are inserted in by means of a stone. But a still more effectual mode is to place them within other pots, rather larger than themselves; a space filled with air being thus interposed between the roots and the source of heat, an effectual security is obtained. To prevent the same injury occurring when the plants are in the earth of the bed, a moderate layer of neats'-dung laid between the earth and the fermenting

mass, is an efficient precaution, and is much preferable to a similarly placed layer of turf, which interrupts too much the full benefit of the heat. A plan recommended by Bradley is well worthy of notice. A woven hurdle somewhat larger than the frame being placed upon the dung, on this its woodwork can rest, and the earth is laid within it, thus the whole can be moved together without disturbance. This would especially be of advantage when bark is employed, which requires occasional stirring to renew its heat in case of emergency, when time cannot be allowed for the bed becoming regular in its heat before the plants are inserted. Besides these precautions, vacancies should be left in the mould, and holes bored with a thick pole into the bed, which must be filled up with hay or dung when the danger is passed.

For ascertaining the internal temperature of the bed, the thermometer is the only certain guide, as it also is for judging of the temperature of the air within the frame; the mode of introducing it into the body of the bed, is to have the thermometer inclosed in a wooden case of the size and form of an ordinary dibble, which is to be lined with baize and fitted with a cap of thinned iron to exclude the exterior temperature. The end which enters the earth is shod with perforated copper. In conjunction with the thermometer, trying sticks may be employed for occasional observation; these are smooth laths of wood, about two feet in length, thrust into different parts of the bed, which, being drawn out and grasped quickly, afford a rough estimate of the heat of the bed.

The small extent of the frame, and the rapid deterioration of the air within it by the plants, render its frequent renewal necessary. To effect this, the common practice is to raise the glasses in proportionate heights according to the state of the air; and to prevent any injury arising when necessarily admitted during inclement weather, mats are hung over the opening; but notwithstanding these precautions, the supply of air can seldom be regular; hence, and from sudden chills, the plants are often checked, and sometimes essentially injured. It may be remarked here, that raw foggy days, if anything, are more unfavourable than those that

are frosty for the admission of air. A complete remedy for all these difficulties is afforded by a plan, which succeeds on the principle that warm air ascends, and simply consists of a pipe passed through the body of the bed, and one end communicating with the exterior air, the other opening into the frame, at one of the top corners of which an aperture must be made; the heated air of the frame will constantly be issuing from this aperture, and its place supplied by that which rises through the pipe. A pipe of lead may be used, about two or three inches in diameter, bent nearly at a right angle, and each limb being three feet long, one of these to be placed horizontally, as the bed is forming, with its mouth extending in the open air, that of the other opening into the frame; a cap should be fitted to the first, and by a slit on its under side, the quantity of air admitted can be regulated.

Although stable manure is generally employed for the constructing of hot-beds, yet there are several other vegetable matters that are also in use for the same purpose. Tanner's bark, from its long continuance and regularity of heat, is much to be preferred, especially for very tender exotics. In many situations it can be obtained at a cheaper rate than stable dung; it should be employed when fresh drawn from the vats, or at most when a fortnight or three weeks old; it must lay in a heap for six or eight days to allow the escape of the superfluous moisture: in summer this is not of such material consequence, as an excess of wet is, at that season, not so liable to prevent fermentation.

If the ground is dry, a pit three feet deep may be dug, and is better lined with slates, boards, or brickwork, but whatever may be the nature of the soil, it is best to form this case or bin of a similar height upon the surface. Without some support the tan will not form a solid bed, and if mould becomes mixed with it, the fermentation is retarded or entirely prevented. The breadth must not be less than five or six feet, or of a length shorter than ten or twelve, otherwise the heat will not be lasting. When the bark is laid, it must be gently settled with the fork, but never trodden upon; for if violently compressed, it loses the power of fermenting; if the bark is fresh and not

ground very small, it attains a sufficient warmth in a fortnight for the insertion of the plants, and will continue in heat for two or three months; the larger the fragments of the bark are, the longer time it requires to ferment, but in an equal proportion it attains a higher temperature and preserves it much longer; a middle sized bark is, therefore, in general to be preferred; and added to the above consideration, it is to be remarked that, when made of large fragments, violent and sudden excesses often arise, even after the bed has been constructed two or three months: on the contrary, if very small, the fermentation soon passes off.

When the crops are removed, and the heat declines, if well stirred, and a load or two of fresh bark mixed with it, the bed will acquire and continue in heat for an equal further lapse of time: this may be repeated throughout the year as often as the heat is found to decline. But it is necessary every autumn, entirely or nearly so, to re-construct the bed with fresh bark; for when the old is far advanced towards putrefaction, it will no longer generate heat.

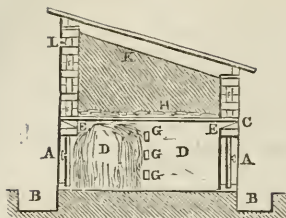
The leaves of the oak and sweet chestnut, and doubtless of many other trees, answer for hot-beds as well or even better than tanner's bark, since they will continue to afford a moderate heat for nearly twelve months without any addition or stirring. They are to be collected as they fall in autumn, and carried to some situation, or be so huddled in, that they may be preserved from scattering by the winds; the heap should be six or seven feet thick, trod firmly down, and moderately watered if dry. In a few days, a very powerful heat is produced, and in five or six weeks will have become so regular, that it may be broken up and the beds constructed with its materials, water being again employed if dryness appears, and they must be well trod down as before. There are many other substances that generate heat during fermentation; there is perhaps no vegetable substance that does not; even a heap of dry sticks acquires a strong accession of temperature if moistened. Mr. Burnet recommends the trial of the refuse matter thrown off in dressing flax, for constructing hot-beds: this refuse he says he has observed, when

left undisturbed, continue at a temperature of 64° for many months, he seems to intimate as long as fourteen. This material is, however, to be had in very few districts. Grass and other green herbage, and even wetted straw mixed with coal-ashes, have been used on an emergency with success. Instead of forming hot-beds with open sides, as has been hitherto described, *pits* of brickwork and other materials, are very generally constructed for containing the fermenting mass. It may be laid down as a fundamental principle, that in applying heat, it should always be brought to the bottom of the body to be heated.

Mr. Flanagan only allows the heat of fermenting dung to be employed, the steam being prevented entering the frame. One advantage arising from this he states to be, that fresh made dung may be employed, and consequently the loss sustained by any preparation is prevented. If, however, it be a fact that the steam of dung is rather beneficial than otherwise, fresh fermenting dung can be used without any detriment that I am aware of in other pits of which we have plans. Mr. F. describes his pit as follows:—"It is four feet deep within, the lowest ten inches of solid brickwork sunk in the earth; the remainder is a flue three inches wide in the clear, carried entirely round the pit, the inner wall of which, forming the sides of the pit, is four inch work, well bedded in mortar, and pointed to prevent the steam penetrating; the outer wall of the flue is also four inch, but open work to admit the steam, and that of dung coatings into the flue, the top of which is rendered tight by a covering of tiles, &c. The frame rests on the external wall of the flue. The cavity of the pit, which is kept dry by means of drains, is nine feet two inches long, two feet eight inches wide, and four feet deep. It is filled with broken bricks to within eighteen inches of the top, then a foot of short cold dung, six inches of very rotten dung trod down so as to admit half an inch depth of coal-ashes, for preventing the intrusion of any worms that may be in the dung, completes the structure."

The accompanying sketch and references will fully explain the plan of Mr. West. DD, chamber in which the dung is placed, three and a half feet deep,

Fig. 86.



surrounded by nine inch brick work. One half of this is filled longitudinally with dung at the commencement, which, if kept close shut up, will last twelve or eighteen days, according to the quality of the dung. As the heat declines, the other side is filled, and the temperature is further sustained by additions to the top of both as the mass settles. When this united heat becomes insufficient, the side first filled being cleared, the old manure must be mixed with some fresh, and replaced, this being repeated alternately to either heap as often as necessary. A A, are the doors, two of which are on each side for the admission of the dung. They are two and a half feet square, fitted into grooves at the bottom, and fastened by means of a pin and staple at the top. B B, are small areas sunk in front, surrounded by a curb of wood; G G G, are bars passing longitudinally as a guide and support in packing the dung; C, represents a bar of cast-iron, two inches wide and three quarters of an inch thick, placed on the edge of which there is a row, a foot asunder across the chamber to support a layer of small wood branches and leaves, H, for the purpose of sustaining the soil, K, in the upper chamber; E E, represents the orifices of which there are a series all round the pit, communicating with the flue F F F, which surrounds the beds: the exterior wall of this flue is built with bricks laid flat, the inner one of bricks set on edge. The flue is two inches wide, and for the sake of strength, bricks are passed occasionally from side to side as ties. The top of the flue, and the internal part of the wall, which rises at the back and front to the level the earth is meant to stand, are covered with tiles, over the joints of which slips of slate bedded in mortar are laid to prevent the escape of

the steam of the dung; I, represents one of two plugs, which stop holes left to regulate the heat and steam as may be necessary. The outer wall supports the lights. For the convenience of fixing the dung, it is best to fill the half of the chamber at the commencement, before the branches, mould, &c., are put in.

Hot-water is a much more manageable source of heat for a hot-bed than fermenting vegetable matter, and for plans see the title *Hot-Water*.

HOT-HOUSE. See *Stove*.

HOTTENTOT CHERRY. *Cassine maurocenia*.

HOTTENTOT-FIG. *Mesembryanthemum edule*.

HOTTONIA *palustris*. Hardy aquatic. Division. Still water.

HOT-WALL is a hollow wall, the interior air being so heated by flues or hot water, as to keep the bricks of which its faces are composed so warm as to promote the ripening of the wood and fruit trained against them.

Mr. Loudon observes, that "the flued wall or hot wall is generally built of brick, though where stone is abundant and more economical, the back or north side may be of that material. A flued wall may be termed a hollow wall, in which the vacuity is thrown into compartments to facilitate the circulation of smoke and heat from the base or surface of the ground to within one or two feet of the coping. They are generally arranged with hooks inserted under the coping to admit of fastening some description of protecting covers, and sometimes for temporary glass frames. A length of forty feet, and from ten to fifteen feet high, may be heated by one fire, the furnace of which, being placed one or two feet below the surface of the ground, the first course or flue will commence one foot above it, and be two feet six or three feet high, and the second, third, and fourth courses narrower as they ascend. The thickness of that side of the flue next the south or preferable side, should, for the first course, be four inches, or brick and bed; and for the other courses it were desirable to have bricks cast in a smaller mould; say for the second course, three inches; for the third, two and three quarter inches; and for the fourth, two and a half inches in breadth. This will give an opportunity of leveling the

wall, and the bricks being all of the same thickness though of different widths, the external appearance will be everywhere the same."—*Enc. Gard.*

Hot walls are generally overheated opposite the first turn of the flue, and not heated enough at a distance from the fire. Mr. Hay has obviated this, by having a hollow in the interior of the wall, serving as a general heat-chamber for diffusing and retaining warm air, and also smoke-flues for conveying heat throughout.—*Hort. Trans.; Gard. Mag.*

The Rev. J. A. H. Grubbe, of Stanton St. Bernard, Wiltshire, has taken out a patent for a *Transmitting-heat wall*. The intention is to erect this partition in gardens, as a substitute for walls, against which fruit trees may be trained, and through which the warmth of the sun may, by reason of their thinness, be transmitted, which will greatly promote the ripening of the fruit, and improve its flavour. The material proposed to be employed for constructing these walls or partitions, is slate of the ordinary quality, in slabs, of the kind usually applied to the roofing of houses. Iron frames are proposed to be prepared for the reception of the slates, like the frames of windows, (with holes in both sides for inserting wires to serve as a trellis,) and the slates being cut to proper shapes and dimensions, may be secured in the rebates of the frame by putty, in the same way as glass. These frames are to be from six to eight feet wide, and of a suitable height, and may be joined together side by side, by rebates or flanges, and held fast by screws, bolts, pins or staples: or in any way that may be found desirable to secure them firmly. Temporary blocks of stone may be placed along the ground to support the partitions, with cross pieces to receive standards or slight buttresses to keep the wall or partition perpendicular, and against the face of the wall, trellis work of wood or other fit material may be placed for the support of the branches of the trees. Walls or partitions for gardens formed in this way will transmit the heat of the sun through them, and hence fruit which may be growing against these walls having a northern aspect, will receive the benefit of the sun's warmth transmitted through the slates. In the construction of these transmitting walls, the patentee does not confine himself

to slate, but considers that plates of iron, applied in the same way, might answer the purpose nearly as well, provided that their surfaces were blackened, which would cause them to absorb more of the solar rays. Even frames of glass might answer the purpose applied in the same manner, and perhaps some other materials might do; but it is desirable that the frames should be light enough to admit of their being removed without difficulty, in order that these partitions may be shifted from place to place, (put under cover during winter,) and set up in different parts of the garden, as convenience may dictate.—*Nicholson's Journ.; Gard. Mag.* See *Wall*.

HOT-WATER as a source of heat for gardening purposes is preferable to any other. It is less expensive, more manageable, and less troublesome than any other. See *Tank System and Stove*. The following are some of the best modes of its application to various structures.

Pine-Pit.—The best that has been constructed is thus described by Mr. G. Fleming:—

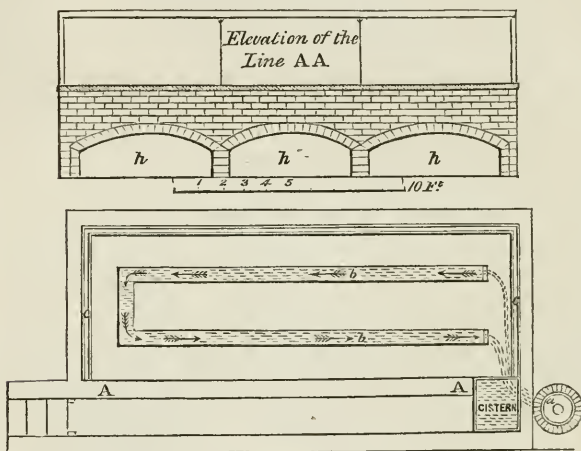
In "a pine-pit recently erected at Trentham, the tank system of bottom-heating and that of hot water pipes for top-heat are combined; and for keeping a sufficient and steady heat with a small consumption of fuel, nothing can be more satisfactory. The pit is seventy-seven feet long, and twelve feet wide inside, and is heated by what is called a saddle boiler. Under the bed are four tanks, into which the water is delivered from the boiler by a four inch pipe, and after pursuing its course, is again received by another pipe. The advantage of two deliveries is, that the water not having so far to go does not get so cold before it is returned to the boiler, and the heat is more regular in all parts of the house. The depth of water in the tanks is about three inches. The tanks are made of brickwork coated with Roman cement. They are arched over with brickwork also, which we find cheaper than covering them with slates, and by leaving interstices between the bricks of which the arch is composed the steam is allowed to escape, and penetrating the stratum of rubble above, to keep the tan in a proper state of moisture. The same boiler also supplies a range of four inch pipe,

which goes round the pit. There are cavities in the wall to permit the steam from below to pass to the top of the pit. The aperture to these can be closed at pleasure, thus insuring a perfect command over the moisture of the atmosphere. There is a chamber which formerly contained a flue belonging to the house that occupied the place of the one I am now describing. This chamber has been left with the view of its being useful for filling with hot dung either for the purpose of assisting to maintain the heat of the house, or for destroying insects. The tanks and

pipes cannot both be worked at the same time, but they are fitted with stop-cocks, so that either can be worked at pleasure, and a few hours in the middle of the day, when the pipes are not wanted, is found amply sufficient to keep up the bottom-heat, as the mass of material when once heated retains its heat for a considerable time."—*Gard. Chron.*

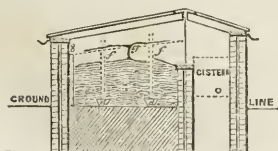
Melon and Cucumber Pit.—For this, Mr. Glendinning, the scientific nurseryman, of Turnham Green, has given the following plans and description.

Fig. S7.



Explanation of the Plan.—A, Burdige and Healy's boiler; b b, iron troughs; c c, pipes; d d, iron troughs as at b b in plan; e e, pipes as at c c in plan; f f, copper tubes fastened to the troughs to admit steam when required; g, wire trellis; h h h, convenient places

Fig. S8.



for the growth of sea kale, rhubarb or asparagus, or keeping tubers of any kind during the winter.

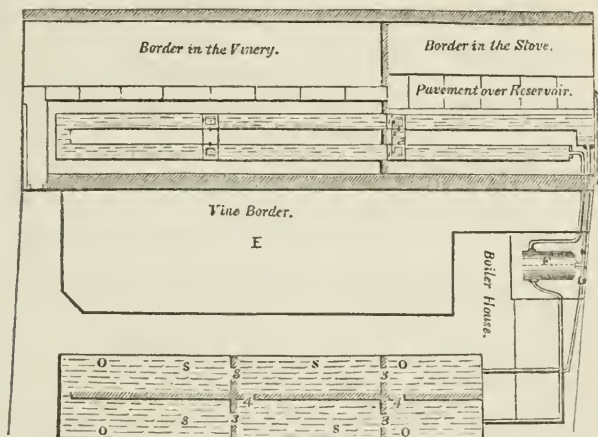
"This pit is intended for melons in summer, and to preserve pelargoniums or other plants in winter. As the object in constructing it is more for the purpose of experiment than the permanent culture of melons, I have designed it so that pines may be substituted without any alteration whatever; indeed any kind of plant which such a structure is capable of receiving, and at the same time requiring protection, and in a warm temperature, may be very advantageously introduced, the hot-water apparatus being so contrived as to command both bottom and surface-heat,

either separately or conjointly. For the purpose of supplying soft water for the plants, I have placed a slate cistern at one end of the pit, in order to collect the rain water from the roof. The soil, if permitted to come in contact with the iron troughs, would, of necessity, become dried and totally unfit for the roots of any plant: with a view to obviate this, I have placed rough flint or other stones over the bottom of the bed and round the troughs to prevent im-

mediate contact, and at the same time to admit of a more uniform diffusion of heat over the bottom of the pit, so that the soil which rests upon it may be more regularly heated. The other advantage and conveniences of this pit will be apparent from the above plan and section without further remark."—*Gard. Chron.*

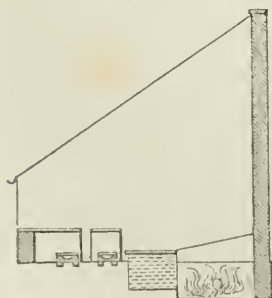
Hot-house.—A hot-water system of heating this structure has been thus detailed by an anonymous writer.

Fig. S9.



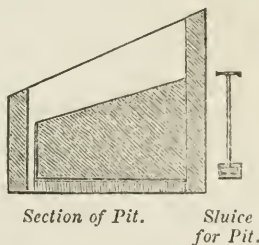
"It will be seen that there is a partition across the house, dividing off about

Fig. 90.



Section of Hot-house.

Fig. 91.



Section of Pit.

Sluice
for Pit.

one-third nearest to the boiler as a hot-house, which can easily be kept at much higher temperatures when required than the remainder of the range, which is intended for a vinery. The circulation may be confined to that exclusively, or suffered to extend throughout the range,

for a longer or shorter period as may be desired. Under the paved walk in the hot-house, a reservoir is formed in brick and cemented, into which all the rain which falls on the roof of the house is collected. A moveable pump is inserted in one end through a hole cut into the stone, for raising the water for use in the house. The gutters are fifteen inches wide and five inches deep, and formed in fifteen inch lengths; simple open troughs, as shown in section, excepting at angles, where there are three pieces, one for each angle, formed in a different mould, there being no joint at the angles, and the two end pieces which are formed with projecting collars to receive the pipes from the boiler. The gutters are covered with tiles, one and a quarter inch in thickness. It will be seen that the flow and return gutters are connected at two points, in order that the circulation may be confined between either and the boiler. At these points the gutters are covered by a wooden frame instead of a tile, in which is fixed a movable cover, which exposes the plugs by means of which the circulation is directed across the house, or extended at pleasure along the entire range. If it is desired to confine the circulation to the stove, the plugs at 1 are inserted, and those at 2 withdrawn. On reference to the section of the house, it will be seen that the back wall is carried down considerably under the level of the ground to admit of a bed of earth on the inside about four feet deep; then comes the reservoir about three feet deep, three wide, and sixteen in length, covered by pavement. The earth on which the gutters are placed has not been moved; but in order to make it level and firm, it was covered with a thin coat of concrete at every fifteen inches, where the joints occur, they are laid on two bricks, in order that the under as well as the upper surface should radiate heat: every foot run of gutter presents a surface of forty inches radiating heat. The potter can deliver these gutters and covers at some distance from the pottery, at 1s. 6d. per foot run; whereas an iron pipe with a four inch bore, which affords but twelve inches of radiating surface, I believe is usually sold at 1s. per foot at the factory. There are two slate tables the whole length of the house, with

room for the gardener to walk between them, to hold the plants, which it is expected will do very well even in the vinery, as there are front sashes, and the vines will be confined to the rafters in the roof. One table rests on one side on the front wall, and on iron legs on the other; the other table is supported entirely by iron legs lying close against the gutters. By this arrangement the gutters are secured against being broken or disturbed by any chance accident. The boiler is of copper, having a pipe at the top through which the hot-water rises, with a cross pipe having two cocks in it with a brass union on each side at the bottom to receive the return pipes; so that the circulation may be carried on throughout the house and the pits at the same time, or confined to either at pleasure by means of the two cocks in the upper pipe.

“The construction of the pits is as follows:—The floor is formed of bricks laid flat on a bed of concrete and set in cement. The tanks are then formed by carrying tiles made of pottery, one inch and a quarter thick and five inches deep, round the outer edge, and on the top of the brick floor, a double row being carried along the centre to support the covering tiles which form a floor, and return tanks about two feet six inches wide; these are covered with tiles the same as the gutters in the house upon which the earth rests. It will be seen on reference to the section of the pits, that the front tank is finished so as to leave a space of about three inches between it and the front wall; slate slabs, two feet six inches deep, rest on the tank to keep up the earth, and at every five or six feet, where the joints in the slabs occur, there is a single brick carried up between the joints and the front wall to support the slabs against the pressure of the earth. The object of this and also of round pipes of pottery which rest on the surface of the tanks at *a*, and pass up through the earth, is to furnish dry heat and to promote a free circulation on the surface, which is found advantageous for propagating. At the points marked *S* are similar pipes, which pass through the tiles covering the tank, which are formed with an opening for the purpose into the tanks; these are fitted at the top with wooden plugs for the

purpose of steaming the pits when requisite. If it is required that the circulation should be confined to the first or second pit nearest the boiler, the sluices 3, are closed, and those at 4 are opened. These sluices are formed by a metallic frame being substituted for the tile at those points in which a small metallic door works on a spindle. This is attached to a rod passing up through the earth, having a handle at the top, just above the earth. In the winter, when the thermometer stood at 23°, there was a bottom-heat of 90°, and of 80° on the surface of the pits then in action, and of 73° in the stove."—*Gard. Chron.*

Open Gutters.—Mr. Griffin, gardener to Mrs. Wells, of Cowley, near Exeter, has published the following remarks upon this mode of circulating hot-water.

"The open trough, or gutter, may be applied to a boiler of any construction. The water flows from the top of the boiler, through a four-inch pipe, into troughs made of cast iron, of the following dimensions; inside measure six inches wide at the top, three inches and a half at the bottom, and seven inches deep; the trough is constructed in lengths three feet long, neatly fitted together by a rivet in the bottom, and one on each side near the top. The water returns in a cast-iron pipe, three inches in diameter. There are thin iron lids or covers, of the same length at each portion of the trough, to fit upon the whole length of the apparatus, so that the degree of humidity may be regulated by making up some portions of the covers, without disturbing the others. The troughs or gutters might be made of various materials, but I prefer iron. The heat is diffused from the surface of the trough or pipes, nearly as quickly as it would be from copper or zinc, and retains the heat much longer. The width and depth of the troughs should be varied according to the plants intended to be grown in the house. An orchidaceous house requires a wider surface on the top than those intended for the growth of ericæ and green-house plants generally. During the resting season of orchidaceous plants, the atmosphere of the house is easily kept less humid, by not removing the whole or any part of the lids.

"For vineries and peach-houses, it

would answer exceedingly well, and entirely eradicate the red spider; for the trough can be covered when the trees are in flower, and when the fruit is approaching towards maturity. On the other hand, during the growing season you may maintain a regularly humid atmosphere with less trouble than by any other means. In a pine-stove, forty feet long, with a walk between the back wall and bark bed, the trough being two feet from the level of the walk, Mr. Griffin says, 'I can command any degree of heat with much less attention than is required for some houses with a boiler of the same description, and equal power as regards pipe.'"—*Gard. Chron.*

HOUND'S-TONGUE. *Cynoglossum.*

HOUSELEEK. *Sempervivum.*

HOUSTONIA. Five species. Hardy herbaceous. Division. Peat.

HOVEA. Sixteen species. Green-house evergreen shrubs. Young cuttings. Sandy loam and peat.

HOVENIA. Two species. Green-house evergreen trees. Ripe cuttings. Loam and peat.

HOYA. Eight species. Stove evergreen twiners. Cuttings. Light loam and peat.

HUDSONIA. Three species. Half-hardy evergreen shrubs. Ripe cuttings and layers. Shaded peat soil.

HUERNIA. Eleven species. Stove evergreen shrubs. Cuttings, dried for a few days. Sandy loam and lime rubbish.

HUGONIA. Two species. Stove evergreen shrubs. Ripe Cuttings. Loam, peat, and sand.

HUMBLE-PLANT. *Mimosa pudica.*

HUMCEA *elegans.* Green-house biennial. Seed. Common soil.

HUMUS. When the putrefactive process of plants is completed, there remains a soft black mass, known as vegetable mould, or humus. One hundred parts of the humus of wheat straw have of extractive or apotheme, rather more than twenty-six parts, and the residue is lime, peroxide of iron, phosphate of lime, and carbonaceous matter. This apotheme is identical with the humic acid of Liebig, the ulmic acid of Braconnot, and the geic acid of Berzelius. It contains—

Carbon	46.6
Hydrogen	20.0
Oxygen	33.4

It was once believed, indeed is still

believed by a few men of science, that this apotheme is the immediate fertilizing component of organic manures, being soluble under some circumstances, and entering at once into the roots of plants, dissolved in the moisture of the soil. But every relative research of more modern chemistry is against this conclusion, and it is now tolerably certain, that a chief nutritive portion of vegetable manures are their carbon converted into carbonic acid, absorbed either in solution with the earth's moisture, or in gaseous form by the roots. Apotheme is only one of the products formed during the progress of putrefaction, and is in its turn a source of carbonic acid. Carbonic acid has been long since shown to be beneficial if applied to a plant's roots. It abounds in the sap of all vegetables, though this be drawn from their very lowest parts, whereas apotheme is injurious to them if they are grown in a solution of it, and minutest analyzers have failed to detect it even within the extreme vessels of roots. — *Prin. of Gard.*

HUNGARIAN LOTUS. *Nymphaea thermalis.*

HUNNEMANNIA *fumariaefolia.* Half hardy herbaceous. Division. Common soil.

HURDLES of iron are the most eligible modes of fencing, whether for permanency or temporary purposes. They are invisible at a short distance, elegant and durable.

HUTCHINSIA. Seven species. Hardy herbaceous alpine. Cuttings. Sandy loam and peat.

HYACINTHUS. Hyacinth. Five species and as many varieties. Hardy bulbs. Offsets. Sandy loam. The species most commonly known is *H. orientalis*, the varieties of which are so conspicuous in our borders and water vases.

Characteristics of Excellence. — “A well grown hyacinth should be of a compact pyramidal form, with a strong, tall, and upright stem, supporting numerous large bells, each attached by a strong foot-stalk in a horizontal position to the stem.

“The bells should be perfectly double, composed of broad, thick, waxy petals, with the centre of the flower raised, rendering the form convex.

“The bells should occupy about one half the length of the stem, with the uppermost bell erect.

“The flowers, whether whole-coloured or striped, should be clear and bright; those having a contrast of colour in the centre are most esteemed.” — *Gard. Chron.*

Offsets. — “The hyacinth is increased by offsets; but to multiply the number of offsets, cuts are made in the under part of the bulb, which, by proper management and a little care, will be found filled with offsets next year.” — *Gard. Chron.*

Soil. — Mr. Mooy, of Haarlem, from whose communication to the *Gardener's Chronicle* this treatise on the culture of the hyacinth is principally taken, says — “They require a fresh, well drained sandy soil, free from lumps or stones, and not mixed with any vegetable matter.” — *Gard. Chron.*

Mr. Horne, an equally good authority, adds, that “the hyacinth must never be planted again in the same soil; but the ground should be allowed to rest for at least two or three years, or should be cultivated with greens during that time; it should also be well mixed again, before planting, with some old cow-dung, especially if the soil is light or sandy, as hyacinths are very fond of that manure.” — *Gard. Chron.*

Moisture. — This being the most destructive agent against which the amateur has to guard, great care should be taken to protect hyacinths from it, by selecting the most elevated spot in his garden. If this is surrounded by a shallow trench, a little distance off, it will be useful, and the bed should also be raised seven or eight inches above the ground level.

Planting and Culture. — “The roots are planted in October, the soil being prepared by having pure cow-dung mixed with it one year previously to the time of planting. We use a barrowful of dung per ten yards square. The ground being measured into beds, the soil is taken out of the first to the depth of five inches, and the bulbs are planted firmly on it, so that the under part is well surrounded with the mould, after which they are covered over with the earth taken out of the next bed to the same depth, which is then ready to be planted, and this is pursued until the whole of the beds are completed.

"As soon as severe weather commences, all the beds are covered over about eight inches deep with reeds, so as to prevent the frost penetrating them. As soon as the frost is gone, the reeds are taken off, and the beds are coated with a mixture of cow-dung and water, to prevent the light sandy soil being blown away by the wind.

"The flowers having opened, and being in perfection, are all cut off, to give greater strength to the bulbs.

Taking up and Storing.—"In July, the bulbs are taken up, and the leaves being pulled off, they are laid down regularly, each bulb on the side, so as to prevent the roots growing again; after this they are covered over with dry soil, one inch above the bulbs, and remain in this state for about a fortnight, to separate the roots and loose skins easily from the bulbs. Great care must be taken during this time that no injury be done to the bulbs by the sun; attention should therefore be paid to keep them well covered over. When taken from this situation, the bulbs are exposed for a few hours to the sun, and kept continually moving with a large brush, to prevent their being scorched; by which means they get that glossy appearance always observed in imported bulbs."—*Gard. Chron.*

"After this management the bulbs require a few weeks' drying in the warehouse; for which purpose they are laid out on platforms, raised a foot and a half above each other, which enables us to look them over occasionally, though this is done principally that they may have a good circulation of air between them. The windows are opened every day on both sides of the warehouse—for the more air and wind we are able to give, the better—that they may be dried and be ready to be packed."—*Gard. Chron.*

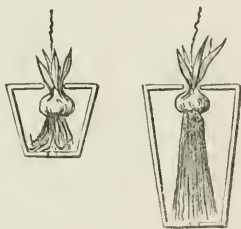
Frost.—"Frost," says Mr. Horne, "is detrimental only when it comes in contact with the bulbs; therefore they should be protected in proportion to its intensity. Those who have bulbs of great value may lay thin planks of wood over the surface when the frost is very intense; but care must be taken not to cover them too deep, especially with the leaves of trees, because these coverings retain the vapour which arises from the soil, and hinder the air from

entering and purifying it."—*Gard. Chron.*

Growing in Pots.—The latest and best directions we have on this point are the following:—"Give them enough space to grow in, without starving their roots. The easiest way to do this is to have pots made of a deeper shape than those in common use.

"By this simple arrangement the roots have sufficient nourishment, while the pots take up no more space on the stand than at present. An inch or two of very rotten cow-dung may be put at the bottom of the pots to promote the richness of colours and perfume of the flowers. Three or four bulbs may be planted in the same pot; but the latter should be sufficiently large, and of the requisite depth; twice the diameter of the top is a good proportion.

Fig 92.



"Lastly, after the bloom is over, put those which are fine varieties, and worth preserving, in some warm and light place; the top shelf of a hot-house, green-house, or vinery, close to the glass, is the most preferable. There they will require no more care nor watering; and after the leaves wither, they may be sorted, and lie by until the planting season returns.

"If these points are attended to hyacinths will suffer but little from forcing, and will flower again the next year."—*Gard. Chron.*

Another equally good authority says—"Grow three bulbs in each pot—upright pots, at least six inches clear inside. After planting, put them in a frame properly drained at the bottom, and slightly protected at the sides, and plunge them in rotten tan, covering the tan over them at least four inches. In very hard weather, a mat to be thrown over them, otherwise no covering at

all; in this state they remain until the flower-stem heaves up the tan. Every pot, as this occurs, to be taken to the green-house, and put at the back of the stage, and shaded by a mat until the stem and leaves become greenish, when gradually brought to more light and air. In this state examine each spike of flowers, and cut out any decaying blossom.

“Water freely, and give as much air as possible during the day; never omit to turn the pot daily, so as to insure that regular pyramidal shape which is so essential to the beauty and symmetry of the spikes of flowers when in blossom.”—*Gard. Chron.*

In Water-Glasses.—In the last week of August, or the first week of September, hyacinths, after being kept for a few days in slightly damped sand, should be placed in their water-glasses. At first the water should only just touch the base of the bulbs, and the glasses should be kept in a dark closet until the roots have attained the length of an inch. Two drops of spirit of hartshorn may be added to the water in each glass, when the bulbs are first put in, and whenever the water is changed. Dark-coloured glass is always to be preferred, as the absence of light is natural to all roots. By keeping the glasses in a dark closet until the roots are full an inch long, the hyacinths will not get top-heavy, but the roots being in advance of the leaves, will preserve the plant balanced erect. The bloom will also be finer, as the roots will be in a state to nourish the leaves before these are prematurely advanced. Dr. Lindley recommends a piece of charcoal to be put into each glass, to feed the plant, and prevent putridity in the water.—*Gard. Almanac.*

Forcing.—Mr. Shearer directs that “In the beginning of October a few bulbs be placed in pots and glasses; the single sorts are best for early forcing, which, if required, could be flowered at Christmas; others are planted at the end of October, and another lot about the middle of November. The pots used are upright thirty-twos, about seven inches deep and four inches wide; the soil half road sand and half leaf mould, with good drainage, and the bulb is placed on coal ashes, in any open part of the garden, and covered to the depth of eight inches with old tan

or leaf mould, as a rustiness or canker is produced on the young leaves and flowers if they come in contact with coal-ashes. In eight or ten weeks they will generally be found in a fit state to be removed to the green-house or cold pit; from thence the most forward are taken to a house in which the temperature is kept from 60° to 65°, and placed about eighteen inches from the glass. If any show indication of expanding their flowers before the stem is of sufficient length above the bulb, a piece of brown paper of the desired length of the stem, is wrapped around the pot, and then placed in a cucumber frame, with the temperature from 70° to 75°. In the latter end of December, or early in January, they rise six or eight inches in about ten days; if later in the season, they advance quicker. When, fully expanded, the plants are taken to a house where the temperature is 60°, and finally to the green-house. The same practice is adopted when hyacinths are grown in glasses, first placing them in a dark room to encourage the protrusion of roots, with a change of water once a week, until they are removed into the frame, or forcing-house, when a fresh supply must be given every day.”—*Gard. Chron.*

“Hyacinths,” says Dr. Lindley, “after having been forced, are three years before they recover themselves. After they have done flowering both in pots and glasses, they should be planted out in the open ground in a bed properly prepared, taking care not to injure the leaves but removing the flower stalk. When the leaves have died away, the roots may be taken up and laid by in some dry place till November, when they should be again planted in a bed in the open ground; this should be repeated the following year; and the year after that, they may be again forced, and will produce as good flowers as they did the first year they were imported.”—*Gard. Chron.*

Diseases.—The hyacinth bulbs are very liable to ulceration, occasioned usually by being treated with too much water.

HYBRIDIZING, or CROSS-BREEDING, though not quite identical, have with the gardener similar objects, viz., either improving the beauty of his flowers, or the flavour and prolificacy of his fruits and culinary products.

Hybridizing, strictly speaking, is obtaining a progeny between two different species; and cross-breeding is obtaining a progeny between varieties of the same species. The progeny of hybrids cannot produce seed; but cross-breeds are fertile. My own observations, and those of others, justify the following statements, as affording some guide to the raiser of varieties:—

1. The seed-vessel is not altered in appearance by impregnation from another plant; therefore, no hasty conclusion of failure is justified by that want of change.

2. The colour of the future seed, not of that first hybridized, seems to be most influenced by the male plant, if its seeds and flowers are darker than those of the female. Mr. Knight found, that when the pollen of a coloured-blossomed pea was introduced into a white one, the whole of the future seeds were coloured. But when the pollen of a white blossom was introduced to the stigma of a coloured blossom, the whole of the future seeds were not white. Capt. Thurtell, from his experiments on the pelargonium, also informs me, that he has always found the colour and spot of the petals to be more influenced by the male than by the female parent. Indeed, all experience proves that the progeny usually, though not invariably, most resembles in colour the male parent.

3. Large stature and robustness are transmitted to the offspring by either parent. It does not absolutely matter for obtaining this characteristic, whether it be the male or female which is large; but Mr. Knight generally found the most robust female parent produced the finest offspring.

4. Capt. Thurtell, from lengthened observation and experiment, has ascertained that the form of the petals follows most closely that of the female parent.

5. Mr. Knight says that the largest seed from the finest fruit that has ripened earliest and most perfectly, should always be selected. In stone-fruit if two kernels are in one stone, these give birth to inferior plants.

6. The most successful mode of obtaining good and very distinct varieties, is to employ the pollen from a male in a flower grown on another plant than that

bearing the female parent. To avoid previous and undesired impregnation, the anthers in the female parent, if they are produced in the same flower with the pistils, must be removed by a sharp-pointed pair of scissors, and the flower inclosed in a gauze bag, to exclude insects, until the desired pollen is ripe. Another effectual mode of avoiding undesired impregnation, is bringing the female parent into flower a little earlier than its congeners, and removing the anthers as above described: the stigma will remain a long time vigorous if unimpregnated.

7. Although the fertility of all the seed in one seed vessel may be secured by applying pollen only to one style, even where there are several, yet the quantity of pollen is by no means a matter of indifference. Koelreuter found, that from fifty to sixty globules of pollen were required to complete the impregnation of one flower of *Hybiscus Syriacus*; but in *Mirabilis jalapa*, and *M. longiflora*, two or three globules were enough; and in the case of pelargoniums, Capt. Thurtell says two or three globules are certainly sufficient.

S. M. Haquin, a distinguished horticulturist at Liege, has impregnated flowers of the *Azalea* with pollen kept six weeks; and *Camellias* with pollen kept sixty-five days. He gathers the stamens just previously to the anthers opening, wraps them in writing-paper, places them in a warm room for a day, collects the pollen they emit, and preserves it in sheet lead in a cool dry place. M. Godefroy suggests, that two concave glasses, like those employed for vaccine virus, would be better. The globules of the pollen must not be crushed. M. Haquin thinks the pollen of one year will be effective if preserved until the year following. Mr. Jackson, of Cross Lanes Nursery, near Bedale, says, he has found the pollen of the *Rhododendron Smithii tigrinum* retain its fertilizing power even for twelve months.

9. It is easy to discern whether impregnation has been effected, as in such case the stigmas soon wither. The stigmas which have not received the pollen remain for a long time green and vigorous. "By the aid of the Stanhope lens," observes Capt. Thurtell, in a letter now before me, "I fancy I can discover the seed of the pelargonium being

closed over in the space of four hours after impregnation."

10. When double flowers are desired, if a double flower should chance to have a fertile anther or two, these should be employed for fertilization, as their offspring are almost sure to be very double.

11. Many analyses of the pollen of various plants have been made by chemists, without throwing any light upon hybridizing. M. Grotthus found the components of twenty-six grains of the pollen of the tulip were—

Vegetable albumen	20.25
Malates of lime and magnesia	3.50
Malic acid	1.00
Malate of ammonia, colouring matter, nitrate of potash }	1.25

12. Superfætation has been doubted; but as it occurs in the dog, we see no reason for disbelieving its possibility in plants. Capt. Thurtell thinks it may be done by the bee introducing mingled pollens at the same instant. Then why not if a similar mixture is inserted by the camel's-hair pencil of the cultivator?

13. Plants nearly related, that is, closely similar in the structure of their various parts, are those only which will immediately impregnate each other; but it is impossible, at present, to say what families of plants may or may not be brought into fertile union through intermediate crosses. A very short time ago, the azalea and rhododendron were thought incapable of such union; but this opinion is now exploded, for rhododendron ponticum has been fertilized with the pollen of azalea sinensis, and the progeny between that evergreen and this deciduous shrub, is the previously unknown phenomenon, a yellow rhododendron. Though such unions may be effected, I entirely agree with Mr. Knight in anticipating that the progeny will be mules, incapable of producing offspring.

HYDRANGÆA. Six species. Hardy deciduous shrubs. Ripe Cuttings. Common soil. The species most common in our gardens is *H. hortensis*. To obtain of this very large flowers on a very small stem, strike cuttings; do not let them branch: grow them in rich soil, and bloom them the following season.

"To get large bushes of hydrangeas in the open air, plant them in good rich soil; form a basin of clay all round them, six inches deep, and in dry weather fill

it with water every evening, after they have got fairly into leaf. Towards autumn withhold watering altogether. Get their wood ripe. For winter, stuff straw between their branches, wrap them well in it, and mat them up."—*Gard. Chron.*

Hydrangeas are best preserved through the winter out of doors, by taking off their leaves in autumn, and putting over each one of the *Shelters* made of straw, as described under that title.

HYDRASTIS canadensis. Hardy tuber. Tubers. Loam and peat, in a moist place.

HYDRAULIC RAM. This is a useful machine, the principle of which is but partially understood and valued. To bring the hydraulic ram into operation, it is necessary that there should be a head or body of water, as a pond, supplied by a running stream, from which a fall can be obtained. The ram is an hydraulic machine composed of a body at the end of which is a valve called a pulse-valve, which is closed by the momentum of a running stream of water. On the top of the body is an air-vessel, in the neck of which is another valve which admits the water into the air-vessel upon the closing of the pulse-valve. The water meeting with an obstruction in the closing of the pulse-valve, immediately makes its way through the valve into the air-vessel. The air in the air-vessel becoming compressed, the valve leading into it closes, and thus liberates the pulse-valve. The same action takes place again with the pulse-valve, and also with the valve that leads to the air-vessel this continuous action takes place; and at each time a portion of water is forced into the air-vessel. When the air in the vessel is compressed so as to overcome the resistance in the pipe leading to the cistern, which it is intended to supply, the water flows over, and continues to do so, as long as the ram remains in action.

There is also a small valve in the neck of the air-vessel, introduced by Mongolfier's son, to supply the vessel with fresh air. Persons acquainted with hydraulics are aware that a column of water is equal to its base; that is to say, a pipe resting on a base four inches square is equal to sixteen times, though it rested on an inch square. This is the principle of the ram, as the falling

column, forcing up the pulse-valve, shuts it. Practice shows that a ten-feet fall will raise a column of water one hundred and fifty feet high, at the rate of five quarts per minute, or *one* part raised to eleven wasted, where the ram is only supplied by a two-inch pipe. I may further add, that theory teaches that a ten-feet fall will raise water three hundred feet high—of course, in a very small quantity. Mr. H. P. M'Birkinbrine, of Philadelphia, has been very successful in the construction of this valuable power.

HYDROCHARIS morsusranæ. Hardy aquatic. Seed and runners. Still water.

HYDROLEA. Two species. One stove evergreen shrub, and the other stove herbaceous. Cuttings. Loam and peat.

HYDROPELTIS purpurea. Half-hardy aquatic. Offsets. Still water.

HYGROMETER is an instrument deserving of employment in the stove, green-house, and conservatory nearly as much as the thermometer; for the correct degree of dampness of the air is of very great importance in the cultivation of plants, and scarcely less than that of the temperature in which they vegetate.

The perspiration from the leaves of plants increases with the air's dryness, and decreases with its moistness. If it be excessive, not only are their juices too much reduced, but the very texture of the leaves is destroyed. If, on the other hand, the perspiration is prevented, the juices are too watery, and the secretions and assimilations are devoid of consistency, rendering the plants too succulent and weak.

"It is impossible for any one to know what degree of moisture he really maintains in a forcing-house without an instrument by which to measure it: that instrument is the hygrometer, which might as well be called the 'water-gauge,' which is what the first word really means. Of the many contrivances to effect this end, the best for all practical purposes, is Daniell's Hygrometer, of which the annexed cut (Fig. 93) exhibits the general appearance. It measures the moisture in the air quickly and precisely, and is not subject to get out of order.

"If moisture is brought into contact with a substance sufficiently cold, a part of the moisture is condensed, and is so

converted from a state of invisible vapour into water.

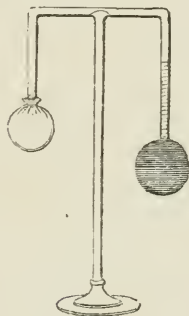
"Thus, in a cold day, the glass roof of a green-house may be seen streaming with water, which runs down and forms 'drip;' and in this often unsuspected manner air is rendered dry, notwithstanding the operations of syringing, steaming, &c. Daniell's Hygrometer is constructed with reference to this circumstance. The figure represents two hollow glass balls containing ether, and communicating by the glass tube which rests on the support. The ball which forms the termination of the longer leg is of black glass, in order that the formation of dew on its surface may be the more perceptible. It includes the bulb of a delicate thermometer dipping in the ether, its scale being inclosed in the tube above the ball; and whatever change takes place in the temperature of the ether is indicated by this thermometer. The other ball is covered with muslin. In making an observation it is first necessary to note down the temperature of the air; next turn the instrument, so that when the muslin-covered ball is held in the hand, the ether may escape into the blackened ball; and it should also be held till the included thermometer rises a few degrees above the temperature of the air, when it should be replaced on the support. Then drop, or gently pour, a little ether on the muslin. The evaporation of this extremely volatile substance produces cold; and attention must be instantly directed to the black glass ball and included thermometer. The latter will be seen falling rapidly; and at length a ring of dew will appear at the line which runs across the black ball—quickly, if the air is very moist, slowly, if the air is dry. If the air is very dry, no moisture will be thus deposited till the thermometer falls to, perhaps, 10°, 20°, or 30° below the temperature of the air. But at whatever temperature the dew forms, that temperature should be noted as the dew-point; and the difference between it and the temperature of the air, at the time, is the degree of dryness according to the indications of this hygrometer. Thus, in a moderately dry day, let it be supposed that the temperature of the air is 65° in the shade, and that the muslin requires to be kept moist, before dew is formed, till the blackened ball containing the

ether has its temperature reduced to 50° , as indicated by the included thermometer, there are then said to be 15° of dryness.

"Again, supposing the temperature is 85° , and the dew-point found, as before, to be 70° , the degree of dryness is still expressed by 15° ; but the quantity of moisture diffused in the air is, notwithstanding, somewhat greater in the latter case than in the former.

"If 1000° represent complete saturation, the quantity of moisture, when the temperature is 65° and the dew-point 50° , will be 609; but when the temperature is 85° and the dew-point 70° , the moisture will be represented by 623; these numbers being ascertained by tables prepared for the purpose. The difference, however, in such

Fig. 93.



a case is so small it is not worth taking into account in a horticultural point of view. But as these numbers can only be ascertained by calculation it is more convenient to reckon by the degree of dryness, bearing in mind that the dryness of the air is indicated by the difference between the temperature of the air and of the dew-point. Thus, if the ring of dew is formed as soon as ether is applied, and only 1° difference is observable, the air is nearly saturated; if the difference is 5° to 10° , the dryness is very moderate; while 15° to 20° of difference indicate excessive dryness, and beyond this the air is parching."—*Gard. Chron.*

"The instrument," says Mr. Ross, "should be held so as to obtain a portion of bright reflection where the dew

is expected to appear; because the dew is most easily seen where the line divides the bright and black reflections on the bulb; and inasmuch as the change may not be noticed the very instant that it occurs, it is well to make a second observation of the temperature at which the dew clears off, and then take the mean of two. If they are both taken equally late, the errors will balance each other; because in one case the mercury is falling, and in the other rising."—*Gard. Chron.*

Mr. J. W. Harris, writing on the same subject, says:—

"As I have for the last three months, used an instrument for the purpose of regulating the moisture of the air in my orchidaceous house which has perfectly answered my purpose, I am induced to offer it to your notice. It consists of an old-fashioned instrument commonly sold in the opticians' shops as Leslie's Differential Thermometer. It is arranged so that, when not in use, the fluid stands at zero in the stem; over the bulb of the opposite stem I place a piece of muslin, which has been well soaked in a strong solution of common salt in water. The muslin having been cut into a circular shape, is laid on the bulb whilst wet; and the moisture will make it adhere sufficiently. A shelf, or bracket, with sides, top, and back, is made for it to stand in, to seclude it from the sunshine—which is of course essential—and also to prevent the damp wall from having effect upon the muslin, so that it may draw all its moisture from the atmosphere alone. It will be found convenient to have a thermometer hung on the same stand, as in all hygrometric observations the state of the thermometer must be attended to. The rationale of its action is simple. If the absorption of moisture exceeds the evaporation from the muslin, heat will be generated, which will expand the air in that bulb, and drive the fluid up the opposite stem, indicating the degree by its rise. On the contrary, if the evaporation exceeds the absorption, cold will be produced, causing the fluid to fall. The general range of the scales made is from zero to 40° . I believe, in my stove, under the general treatment of orchidaceous plants, temperature ranging from 78° to 95° , the hygrometer has ranged from 15° to 30° . Of course, if the instrument were found to require it, it would

be lengthened in the stem, so as to range to any degree required; but I do not anticipate that a greater range would be required for the coldest pit or green-house. As I have found it very useful in my own stove, I hope it may be of service to your readers; and as it is self-acting, so I trust it will be found on trial, 'simple, economical, and effectual.'—*Gard. Chron.*

HYGROPHILA ringens. Stove evergreen trailer. Cuttings. Rich light soil.

HYLESINUS PINIPERDA. A species of beetle which preys upon the pith of young shoots of sickly or recently felled Scotch and spruce firs. It is not very injurious in this country.

HYLOTONIA rosæ. A saw-fly which injures rose-trees seriously by puncturing in rows their young shoots, and depositing in the holes its eggs. The best remedy is spreading a cloth beneath the trees in the evening, and killing the insects shaken down upon it.—*Gard. Chron.*

HYMENÆA. Locust-tree. Three species. Stove evergreen trees. Cuttings. Loam and peat.

HYMENANTHERA dentata. Green-house evergreen shrub. Cuttings. Peat and loam.

HYMENOPHYLLUM. Two species. Hardy ferns. Seed and division. Loam and peat.

HYOSCYAMUS. Henbane. Four species. Two half-hardy evergreen shrubs; one hardy annual; and the fourth biennial. Cuttings or seed. Common soil.

HYPECOUM. Three species. Hardy annuals. Seed. Common soil.

HYPERICUM. Seventy-three species. Hardy, half-hardy, and green-house. Mr. Paxton says the two latter thrive in loam and peat, propagated by young cuttings; the hardy shrubs and herbaceous grow from seed or division in any soil; and the annuals may be sown in spring in the open ground.

HYPHENÉ coriacea. Stove-palm. Seed. Sandy loam.

HYPOCALYPTUS abcordatus. Green-house evergreen shrub. Young cuttings. Sandy loam and peat.

HYPOESTES. Five species. Stove plants of various character; chiefly evergreen shrubs. These, and the herbaceous species, propagate by cuttings in a light soil.

HYSSOP. *Hyssopus officinalis.*

Varieties.—There are three varieties, the white, red, and blue; the last of which is most commonly cultivated.

Soil and Situation.—A dry soil is the one most appropriate for it. If on a rich or wet one, it is generally destroyed by the frost, as well as rendered less aromatic.

Time and Mode of Propagation.—It is propagated by seed, and slips of the branches, and young shoots, as well as by offsets. The seed may be sown from the close of February until the end of May. Rooted offsets may be planted in March, April, August and September; cuttings of the branches in April and May; and slips of young shoots in June or July. The seed may be inserted in drills, six inches apart, not deeper than half an inch. It is the usual practice, when the seedlings have attained the growth of six weeks, to prick them out twelve inches apart; but it is by much the best practice to raise them where they are to remain.

The slips and offsets are best planted at first in a shady or north border: they are generally firmly rooted in two months. In September or October they are all fit for removal to their final stations. After every removal they must be watered plentifully and regularly until established. The only subsequent cultivation requisite is the keeping them free of weeds by frequent hoeings.

In spring and autumn likewise all decayed branches and flower-stalks must be removed; those used as edgings trimmed close, and the earth gently stirred around them.

IBERIS. Candy-Tuft. Twenty-three species. A few hardy evergreen shrubs; but chiefly hardy annuals, biennials, and perennials. Seed. Common light loam.

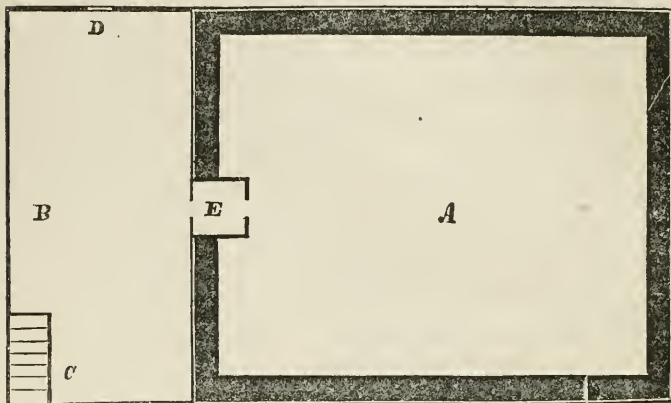
ICE-HOUSE. Any vacant out-house which can be thoroughly drained will be an efficient ice-house. Moisture is a much more rapid solvent of ice than mere heat. If in an out-house, with drains leading from its floor, a layer of faggots three feet deep be placed, and round the sides of the house a lining of stubble or straw nearly as thick, and then the ice be rammed in hard, and covered over with a similar coat of stubble, the ice may be preserved there for twelve months.

“The accompanying drawing and de-

scription of an approved ice-house and dairy united, has been contributed by John C. Boyd, Esq., of Danville, Pa. Mr. B. says, "For various purposes it is far superior to the best constructed spring-house; permitting to the largest extent all the luxuries of sweet cream

and milk, the preservation of fresh meat, pies, fruit, &c., for a length of time. Mine has been in use two years, and during that period, we have not had any milk to sour, which cannot be said by those dependent on spring-houses."

Fig. 94.



"A represents the ice-house, proper. B dairy-room. C the steps thereto. D window in dairy-room. E entrance into the ice-house.

"The whole length, 24 feet: width 15 feet; pit sunk, 5 feet in ground; stone wall carried $2\frac{1}{2}$ feet above ground; making depth of stone work $7\frac{1}{2}$ feet. On stone work, a frame of 8 feet to the square is placed. Weather-boarded on the outside in usual manner. Over milk house, on top of wall is placed, joist 18 inches from centre to centre, on which a tight floor is laid, which forms a convenient room for keeping various things connected with the dairy.

"The partition between the ice-house and milk-house is formed by setting up studding from the sill in the bottom of the ice-house to the square under the roof, and weather-boarded with inch boards halved together, well nailed, so as to prevent any charcoal dust, or dust of the bark from dropping down into the milk trough.

"The inside frame is made 12 inches less all round than the inside of main building. That is to say, a space of 12 inches, (and it would be better if it

were 15,) must be left between the two frames—to be filled in with charcoal or tanner's bark, well dried, and well rammed when filled.

The inside frame may be very simply and cheaply made, by taking four pieces of scantling, say 4 by 6, and halving them together—and planking, or double boarding up or down on the inside—three of those frames—one on the floor—one midway, and the other at top, are sufficient.

"The floor, which is the most particular part, should be made by placing in the bottom good oak sills, with a descent from the back part of an apartment to milk-house of 15 inches. The sills well bedded in clay, tan bark or charcoal. Mine is bedded in common yellow clay, well pounded in.

"The floor should be well laid, either of plank, jointed, or boards double, and small grooves run along to carry ice water down to the milk trough. This floor should be the size of the ice room before inside frame is erected. On that part of the floor which passes under the partition between the ice and milk-houses, small strips of a quarter of an

inch thick should be laid, and a board fitted down tight to keep the filling-in from stopping up the water as it leaves the ice. On top of square, joists with floor on, is laid and covered about 2 feet thick with tan-bark. A ventilator should be made through the upper floor and roof about 2 feet square.

"The closet or recess formed on each side of the small doors, leading into the ice, may have hooks to hang meats, or shelves, on which anything may be set. This closet, or cold room, is 3 feet 3 inches, by 3 feet 6 inches—5 feet high, two doors in centre, each 18 inches wide, made of a single board, and made to fit closely.

The ice may be put in on either side just under the upper joists; an opening 18 inches by 2 feet is sufficiently large, with two doors, or shutters—and the space between, when the ice is in, should be well stuffed with straw. No straw to be used in filling ice-house—except on top, when a good supply will be of service.

"The milk-house should be well white-washed. The room above milk-house should be lined on inside of shedding, and the space between filled with tan-bark or charcoal. The covering may be a shed-roof, or any other form best suited to the convenience of the location. The door of my ice-house is within a few steps of my back kitchen door. An arbour of grape vines adds much to the comfort and coolness of the establishment.

"In filling the ice-house, much pains should be taken to pack the ice closely. The ice is taken out by entering from the milk-house through the small doors, and any child who can use a hatchet can procure ice for the use of the house.

"The ice-water, if the troughs are made tight, (and they ought to be perfectly so,) will keep them full, or nearly so, and during south winds may overflow a little. The milk-room is too cold to do the work in, therefore there is no water but the ice water to get clear of, which will disappear without giving any trouble."—*Rural Register*.

For an interesting article on this subject, See Downing's "Horticulturist."

ICE-PLANT. *Mesembryanthemum crystallinum*.

ICHNOCARPUS *frutescens*. Stove evergreen twiner. Cuttings. Peat and loam.

ILEX. Holly. Fifteen species. Chiefly hardy evergreen trees; but *I. paraguensis* and *I. salicifolia* require the shelter of a stove; and *I. angustifolia*, *I. chinensis*, and *I. perado*, that of a green-house. Cuttings, budding, grafting, and seed. Deep light loam. See *Holly*.

ILLICIAM. Three species. Half-hardy evergreen shrubs. Cuttings and layers. Light loam.

IMPATIENS. Balsam. Nine species. Hardy, half-hardy, and stove annuals. *I. natans* is a stove aquatic; seed, rich loam, in water. *I. scapiflora* is a stove bulb; offsets; light rich loam. Half-hardy annuals sow in a hotbed, and hardy in borders. (*Paxton's Bot. Dic.*) See *Balsam*.

IMPREGNATION. "No seed ever attains the power of germinating, unless the pollen from the stamens in the same, or some nearly allied flower, has reached and impregnated its pistils.

"In favourable seasons, when genial warmth and gentle winds prevail, impregnation is readily effected by the plant's own provision. The pollen is never shed from the anther of the stamen, until the stigma of the pistil is fully developed, and this soon withers after the contact.

"Their all-provident Creator has invariably arranged efficient assistance. The agents usually called in are insects; these, in their search after honey and wax, visit the inmost recesses of flowers, and bear from the anthers to the stigma, and from flower to flower, the fecundating dust. Here, too, I may remark upon another instance of that Providence which makes all things fitting and appropriate; for those who have made the bee their study, relate that though this insect does not confine itself to one species of flower, yet it restricts its visits during each ramble to that kind which it first visits. How this facilitates impregnation is obvious, when it is remembered that no flower can be fecundated but with pollen from a kindred species.

"This efficient agency of insects suggested, that in hothouses, from whence they are almost totally excluded, other artificial means might be adopted with success to render flowers fertile that had hitherto failed in producing seed. Thus the gardener always finds the advantage of using the camel hair pencil to apply pollen to the stigmas of his

forced melons, cucumbers, cherries, and peaches.”—*Principles of Gardening*. See *Hybridizing*.

INARCHING, or *Grafting by approach*, differs from grafting only in having the scion still attached to its parent stem whilst the process of union with the stock is proceeding. It is the most certain mode of multiplying an individual that roots or grafts with difficulty, but is attended with the inconvenience that both the stock and the parent of the scion must be neighbours. The most ingenious application of inarching is one suggested by Mr. Knight. If a fruit-bearing branch becomes denuded of its leaves above the fruit it has produced, this either falls or remains stunted and deficient in flavour, owing to being thus deprived of a supply of the elaborated sap or proper juice. In such case a branch having leaves of the same or of a neighbouring tree, was inarched to the denuded portion of the branch the fruit of which he was anxious to taste. It produced that season only two peaches, and from the branch bearing which all the leaves had fallen; but after the inarching the fruit proceeded to maturity.—*Principles of Gardening*.

To propagate any tree or shrub by this method of grafting, if of the hardy kind, and growing in the open ground, a proper quantity of young plants for stocks must be set round it, and when grown of a proper height, the work of inarching performed; or if the branches of the tree you design to graft from is too high for the stock, stocks must be planted in pots, and a slight stage erected around the tree of due height to reach the branches, and the pots containing the stock placed upon the stage.

As to the method of performing the work, it is sometimes performed with the head of the stock cut off, and sometimes with the head left on till the graft is united with the stock, though by previously beheading it the work is much easier performed, and having no top, its whole effort will be directed to the nourishment of the graft. Having the stocks properly placed, make the most convenient branches approach the stock, and mark in the body of the branches the parts where they will most easily join to the stock, and in those parts of each branch, pare away the bark and part of the wood two or three inches

in length, and in the same manner pare the stock in the proper place for the junction of the graft, then make a slit upward in the branch so as to form a sort of tongue, and make a slit downward in the stock to admit it; let the parts be then joined, slipping the tongue of the graft into the slit of the stock, making the whole join in an exact manner, and tie them closely together with bass, and afterwards cover the whole with a due quantity of clay, or wax. After this let a stout stake be fixed for the support of each graft, and so fastened as to prevent its being disjoined from the stock by the wind.

The operation being performed in spring, let the grafts remain in that position about four months, when they will be united, and they may then be separated from the mother-tree; in doing this be careful to perform it with a steady hand, so as not to loosen or break out the graft, sloping it off downwards close to the stock; and if the head of the stock was not cut down at the time of grafting, it must now be done close to the graft, and all the old clay and bandage cleared away and replaced with new, to remain a few weeks longer.

Observe, however, that if the grafts are not firmly united with the stock, let them remain another year till autumn, before you separate the grafts from the parent tree.—*Abercrombie*.

“Instead of approach-grafting in the usual manner, it is sometimes convenient to detach shoots of the kinds to be propagated from the plants on which they grew, and inarch them upon the single plant, leaving a piece at the bottom of each shoot sufficiently long to thrust into a phial, which must be kept constantly supplied with water.”—*Gard. Mag.*

INDIAN BAY. *Laurus indica*.

INDIAN BLUE. *Nymphaea cyanea*.

INDIAN CRESS. *Tropaeolum*. See *Nasturtium*.

INDIAN FIG. *Opuntia*.

INDIAN LOTUS. *Nymphaea lotus*.

INDIAN SHOT. *Canna indica*.

INDIGOFERA. Indigo. Forty-four species. Chiefly green-house and stove shrubs. Young cuttings. Sandy loam and peat.

INGA. Twenty-eight species. Stove evergreen trees and shrubs. Cuttings. Peat and loam.

INOCULATION. See *Budding*.

INOCULATING GRASS. See *Turf*.

I P O M Æ A. Sixty-four species. Chiefly green-house and stove twiners. *I. caudicans*; *I. lacunosa*; *I. pandurata*; *I. sagittifolia*; *I. sibirica*; *I. sinuata*; and *I. trichocarpa*, are hardy. Cuttings. Rich loam and peat. Annuals and biennials by seed in a gentle hotbed, as directed for the following:—

“The best time for sowing *Ipomæa quamoclit*, and *rubro cærulea* for planting in the open air, is the end of February. They will both succeed under similar treatment, viz., to sow them in a gentle hot-bed, to pot them off separately, and encourage their growth until the end of May, when they may be planted out in light rich soil in a sheltered situation.”—*Gard. Chron.* Or sow the seed in May or June in a warm situation, having previously soaked it for forty-eight hours in soft water.

I P O M O P S I S *elegans*. “Hardy biennial. Seed. Peat and loam, in a cold frame during July; leave three in a pot, and place in green-house for winter; water moderately; shift in spring into forty-eights well drained; leave only two plants in a pot; water very moderately.”—*Parson's Bot. Dict.*

I R E S I N E. Four species. Half-hardy herbaceous. Seeds, in a gentle hotbed. Rich loam and peat.

I R I S. Eighty-nine species. Chiefly hardy bulbs. *I. clandestina*; *I. crassifolia*; and *I. deflexa*, require the shelter of a greenhouse. The soil cannot well be too sandy for them. Seed or division of the roots.

Dr. Lindley gives the following directions for cultivating the English and Spanish species:—

“About August prepare a bed two feet deep, the soil of which must be composed of equal parts of rich loam, sandy peat, and either well rotted dung or leaf mould, all well incorporated together. The beginning of September, plant the bulbs about three inches deep, placing a little fine sand around each, and afterwards cover and level the surface; nothing else will be required except stirring the surface of the soil in the spring. The Irises will bloom about the middle of June, and the seeds will ripen in the beginning of August; when, if it is required, the bulbs should be taken up; but it must be observed that when they are removed they seldom

flower well the following season, and therefore should not be replanted more than once in five or six years. When the bulbs are taken up they should be placed in dry sand for about a month, and afterwards planted in the manner before mentioned. Seeds of Irises should be sown in drills in September, in light sandy soil; they will come up the following spring, but the young bulbs should remain for two or three years before they are removed.

“The best way to treat the Persian Iris, is to place the roots, in October, in pots filled with a mixture of either sandy loam well drained and leaf mould, or sandy peat and well rotted dung, and set them in some dry pit for the winter, and give but little water until the spring, and when they begin to show their blooms, plant them in the open bed. If this is carefully done they will be gay during April and the beginning of May, but they must be protected from the spring frost when in bloom, or they will not last long in flower. Persian Irises are tender, and will not survive the winter in the open border, unless the situation is dry, for they suffer more from the effects of damp than cold. They may also be grown like hyacinths in glasses filled with water, in the windows of sitting rooms, and are desirable for such a situation, as two or three plants will scent a room. They also succeed in pure sand if the roots are strong.

“The roots must be taken up in the open beds every season, and either potted or preserved in sand during the winter, but if not potted before the spring they become exhausted, and do not flower well, whereas if planted in the open bed in autumn, they are almost sure to perish.”—*Gard. Chron.*

I R I S H H E A T H. *Menziesia polifolia*.

I R O N - W O R T. *Sideritis*.

IRRIGATION, as employed by the farmer, is chiefly beneficial in proportion to the amount of saline and decomposing matter contained in solution by the water employed. But this is not the exclusive cause of benefit, for much of this arises from the increased and permanent supply of moisture to the roots of the plants. These can only derive food from the soil in a gaseous or liquid form; and the decomposing matters in a soil decompose, and constantly are converted into gaseous and soluble mat-

ters, with a rapidity proportioned to the abundance of water supplied to them. Experience shows that there is in the kitchen garden scarcely a crop that is not benefited by a much more abundant supply of water than can be obtained usually; and I can bear testimony to the correctness of Mr. Knight's conclusion, not limiting, however, my approval of such abundant watering to late crops of peas, but to all, as well as beans, spinach, and the entire cabbage tribe. Kidney beans and potatoes are not benefited by such an abundance of water.

"The quantity of water," says Mr. Knight, "which may be given with advantage to plants of almost every kind, during warm and bright weather, is, I believe, very much greater than any gardener who has not seen the result will be inclined to suppose possible; and it is greater than I myself could have believed upon any other evidence than that of actual experience.

"My garden, in common with many others, is supplied with water by springs, which rise in a more elevated situation; and this circumstance afforded me the means of making a small pond, from which I can cause the water to flow out over every part of every other kind through every part of the summer; and I cause a stream to flow down the rows of celery, and along the rows of brocoli and other plants, which are planted out in summer, with very great advantage. But the most extensive and beneficial use which I make of the power to irrigate my garden by the means above mentioned, is in supplying my late crops of peas abundantly with water, by which the ill effects of mildew are almost wholly prevented, and my table is most abundantly supplied with very excellent peas through the month of October."

ISERTIA *coccinea*. Stove evergreen shrub. Cuttings. Sandy loam and peat.

ISMENE. Five species. Stove bulbs. Offsets. Turfy loam and peat.

ISOPLEXIS. Two species. Green-house evergreen shrubs. Seed and cuttings. Light rich loam.

ISOPOGON. Fifteen species. Green-house evergreen shrubs. Ripe cuttings. Turfy sandy loam.

ISOPYRUM. Two species. Hardy. One annual, the other herbaceous. Seed. Light loam.

IVY. *Hedera*.

IXIA. Twenty-four species. Green-

house bulbs; but most of them, in light soil and south border, protected slightly in winter, will grow in the open air. Those grown in pots should be kept in a dry place until the beginning of November. The soil best adapted for them is a sandy peat mixed with a little loam. After repotting in that month, they may be kept in a cool airy situation, and as soon as they begin to grow, they may be watered freely, and placed in the green-house.—*Gard. Chron.*, &c.

IXODIA *achilleoides*. Green-house evergreen shrub. Cuttings. Peat and sand.

IXORA. Fourteen species. Stove evergreen shrubs. Cuttings. Sandy loam and peat.

JABOROSA. Two species. Hardy herbaceous. Cuttings. Light rich loam.

JACARANDA. Seven species. Stove evergreen trees. Cuttings. Sandy peat and loam.

JACKSONIA. Four species. Green-house evergreen shrubs. Cuttings. Sandy loam and peat.

JACOBÆA LILY. *Amaryllis formosissima*.

JACQUINIA. Six species. Stove evergreen shrubs. Cuttings. Sand and peat.

JALAP. *Mirabilis jalapa*.

JAMAICA EBONY. *Brya ebenus*.

JAMAICA REDWOOD. *Gordonia hæmatoxyton*.

JAMAICA ROSE. *Meriania*.

JAMBOSA. Seven species. Stove evergreen trees. Ripe cuttings. Loam and peat.

JANUARY is a month requiring little more from the gardener in the out-door department than attention to neatness, but it usually requires more than ordinary care to his hot-house and forcing department. The following directions contain the principal routine work of the month:—

KITCHEN GARDEN.

Artichokes, attend to, shelter, &c.—*Asparagus*, plant in hot-bed; attend to the forcing; temp. about 65°, and at night 50°.—*Beans*, plant in hot-beds.—*Brocoli*, protect from frost.—*Cardoons*, attend to, shelter, &c.—*Cauliflowers*, in frames, and those pricked out, attend to.—*Composts*, prepare and turn over.—*Cucumbers*, sow and prick out; temp. by day 80°, and at night 65°.—*Dung*, for

hot-beds, prepare; wheel on to vacant ground.—*Earth*, for hot-beds, prepare.—*Frost*, protect plants from.—*Ground*, trench vacant.—*Hot-beds*, make and attend to.—*Kale* (Sea), begin forcing, b.—*Kidney Beans*, sow in hot-bed, e.—*Lettuces* in frames, attend; transplant to force.—*Melons*, sow, for fruiting in May; day temp. 75°, night 65°.—*Mint*, force, in hot-bed.—*Mushroom Beds*, make, and attend to those producing; procure horse droppings for.—*Mustard and Cress*, sow in hot-bed.—*Onions*, examine stored.—*Parsley*, protect from frost.—*Peas*, plant in hot-bed; and prepare sticks.—*Potatoes*, plant in slight hot-bed.—*Radishes*, sow in hot-bed.—*Rape* (for salading), sow in hot-bed.—*Rhubarb*, begin forcing, b.—*Tansy*, plant in hot-bed.—*Tarragon*, plant in hot-bed, and do any work which will lessen that of the following busier months.—*Woodlice*, destroy in the mushroom-house.

ORCHARD.

Apples (Espalier), prune, &c.—*Apri-cots*, prune and train in frosty weather. *Brine*, apply with a scrubbing brush to stems and branches of fruit trees, to destroy insects, eggs, and moss.—*Cherries* (Wall and Espalier), prune and train.—*Currants*, prune.—*Espaliers*, prune and regulate.—*Figs*, protect from frost.—*Fork* the surface around fruit trees.—*Gooseberries*, prune.—*Mulch*, put around newly planted trees.—*Nectarines*, prune and train in frosty weather.—*Peaches* (see *Nectarine*).—*Pears* (Espalier), prune, &c.—*Plums* (Wall and Espalier), prune.—*Pruning*, attend to generally.—*Raspberries*, prune.—*Snails*, destroy in their torpid state.—*Stake* and support trees newly planted.—*Standards*, remove dead and irregular branches from.—*Trench* and prepare borders, &c., for planting.—*Vines*, prune and train.—*Wall Trees* generally, prune and regulate.—*Walls*. It is a very beneficial plan to paint these by means of a white-washer's brush, with a liquid mixture of 8 lbs. lime, 4 lbs. soot, and 8 lbs. sulphur. It destroys and banishes insects, as well as by its dark colour promoting the warmth of the wall. The liquid employed, in which to mix the above, should be urine and soapsuds in equal proportions.

FLOWER GARDEN.

Anemones, protect from cold, &c.—

Annals, sow in pots and put in hot-house, &c., b.—*Auriculas*, protect from cold, &c.; give earth and compost to.—*Carnations*, protect from cold, &c.—*Cuttings* of hardy deciduous shrubs may be prepared, e.—*Edgings*, make. Slate painted green, and *Gentianella* planted within, is handsome and durable.—*Gravel*, roll in dry weather.—*Hedges*, of Privet, &c., plash.—*Hyacinths*, protect from cold, &c.—*Layers* of hardy shrubs may still be pegged down.—*Manure*, apply generally.—*Mulch*, put round roots of lately planted trees.—*Potted Plants*, secure well from frost.—*Prune*, and regulate flowering shrubs.—*Ranunculuses*, plant, if before omitted; protect from cold, &c.—*Rose Trees*, scrub with brine, to destroy scab, insects, &c.—*Salt*, sow over grass, to drive away worms, &c.—*Seedlings*, in borders, protect with mats.—*Trench* vacant ground.—*Tulips*, protect from cold, &c.; plant, if omitted, b.

HOT-HOUSE.

Air, admit as much as possible.—*Apri-cots* (see *Peach*).—*Bark Beds*, stir, and renew, if heat declines.—*Cherries* (see *Peach*).—*Cucumbers*, in pots, introduce; water frequently, and train.—*Currants*, water frequently.—*Figs* (see *Vines*). They should be in pots in the Vinery.—*Flowers* in pots (*Roses*, *Carnations*, &c.) introduce. *Gooseberries*, water frequently.—*Head down* specimen plants, as *Justicias*, &c.—*Kidney Beans*, sow in small spots, not larger than twenty-fours; water frequently.—*Light*, admit as freely as possible.—*Mats*, put over glass in very severe weather, even in the day time.—*Nectarines* and *Peaches* in blossom keep at about 55° during the day, and at night about 40°; water very sparingly; shake branches gently to distribute the pollen; stir earth around often.—*Pine Apples* (fruiting), require increased bottom heat to about 85°; water about once a week; temperature in house from 60° to 70°.—*Salading*, in boxes sow.—*Slove*, temp. not above 60° in the day, and at night 40°.—*Strawberries*, in pots, introduce; when blossoming, water frequently; day temp. not more than 55°.—*Thermometer*, watch its dictates.—*Vines*, in leaf, keep about 60°; in blossom about 70° during day, at night 50°; protect stems outside by haybands; give liquid manure.—*Wash* the leaves

of all plants, as requisite, either with a sponge or by watering.—*Water*, soft and warm as the house, apply as requisite; in pots, &c., keep constantly in the house.

GREEN-HOUSE.

Air, admit at every favourable time, when the temperature outside is above 32°.—*Earth* in the pots and borders, stir frequently.—*Fires* to exclude frost and damp should be lighted as required; day temp. 50°, night temp. 40°.—*Fogs*, especially exclude. *Leaves*, wash, when foul; (decayed), remove as they appear.—*Succulent Plants* now scarcely require any water.—*Water* sparingly, and in mild weather, and about noon.—*Windows*, keep closed both in foggy and frosty weather; cover with mats or shutters in rigorous seasons, even in the day time.

JASIONE. Two species. Hardy herbaceous. Seed. Division and cuttings. Peat.

JASMINUM. Jasmine. Thirty-two species. Stove, green-house, and hardy climbers, twiners, and shrubs. Ripe cuttings. The stove and green-house species require sandy loam and peat, but the hardy species any common soil.

JEFFERSONIA diphylla. Hardy herbaceous. Seed and division. Common soil.

JERSEY THISTLE. *Centaurea is-nardi.*

JERUSALEM ARTICHOKE. *Helianthus tuberosus.*

Soil and situation.—It flourishes most in a rich light soil with an open exposure. Trees are particularly inimical to its growth.

Time and Mode of Planting. As it never ripens its seed here, though it blossoms sometimes in October, the only mode of propagation is by planting the middle-sized bulbs, or cuttings of the large ones, one or two eyes being preserved in each. These are planted towards the end of March, though it may be performed in February, or even preferably in October.

They are inserted by the dibble in rows three feet by two feet apart, and four inches deep. They make their appearance above ground about the middle of May. The only attention necessary is to keep them free from weeds, and an occasional hoeing to loosen the surface, a little of the earth

being drawn up about the stems. At the close of July or early in August, cut the stems off about their middle, to admit more freely the air and light, and in other respects to be beneficial to the tubers.

They may be taken up as wanted during September; and in October, or as soon as the stems have withered, entirely, for preservation in sand for winter's use. They should be raised as completely as possible; for the smallest piece of tuber will vegetate and appear in the spring. It is for this reason that they are often allotted some remote corner of the garden; but their culinary merits certainly demand a more favourable treatment.

JERUSALEM SAGE. *Phlomis fruticosa.*

JET D'EAU. See *Fountain.*

JOHNIA. Two species. Stove evergreens; one a climber, the other shrubby. Ripe cuttings. Loam and peat.

JOLLIFFIA africana. Stove evergreen twiner. Cuttings of flowering shoots. Sandy loam and peat.

JONESIA. Two species. Stove evergreens; one climbing, the other a tree. Cuttings. Sandy loam and peat.

JONQUILLE. See *Narcissus.*

JOSSINIA orbiculata. Stove evergreen shrub. Cuttings. Loam and peat.

JOVE'S FRUIT. *Laurus diospyros.*

JUDAS TREE. *Cercis.*

JUGLANS. Walnut tree. Five species, besides varieties. Hardy deciduous trees. Seed and grafts. Rich loam. See *Walnut.*

JULUS. *Snake millipede.*

J. terrestris.—Has about two hundred legs. Lead colour. Scaly, like woodlouse. Eats the roots of the pansy.

J. pulchellus.—Ochreous colour, with crimson spots down its sides. Legs, about 170. Attacks roots of beans, cabbages, peas, and scarlet beans.

J. complanatus. Lilac colour. Sixty legs.—*Gard. Chron.*

JULY is a busy month, as will appear from the following directions:—

KITCHEN GARDEN.

Alexanders, earth up.—*Artichokes*, attend to.—*Asparagus-beds*, clean; leave off cutting from.—*Beans*, plant, b.; leave some in production for seed.—*Beet* (Red), thin, b.; (Green and White), sow, b.—*Borage*, sow, c.—*Borecole*,

plant; prick out.—*Brocoli*, prick out; plant.—*Cabbages*, plant; prick out seedlings; earth up advancing.—*Carrots*, thin, b.;—*Cauliflowers*, plant, e.—*Celeriac*, plant.—*Celery*, prick out; plant; earth up.—*Chamomile Flowers*, gather.—*Chervil*, sow, e.—*Coleworts*, plant.—*Coriander*, sow.—*Cress*, sow.—*Cucumbers*, plant for pickles.—*Earth* up where necessary.—*Endive*, plant; sow.—*Finochio*, earth up.—*Garlic*, take up as wanted.—*Hoeing*, particularly attend to.—*Horse-radish*, attend to.—*Kidney Beans* (dwarfs), sow; attend to advancing crops.—*Lavender*, gather.—*Leeks*, weeds, &c.; plant, b.—*Lettuces*, plant; sow; *Marigold Flowers*, gather.—*Marjoram*, gather for drying.—*Melons*, attend to;—*Mint*, plant, b.—*Mushroom-beds*, attend to; make, e.; spawn, collect.—*Parsley*, sow.—*Parsnips*, weed, &c.—*Peas*, sow; hoe advancing.—*Peppermint*, gather.—*Pot-herbs*, are fit in general for drying and distilling.—*Radishes*, sow.—*Rampion*, is fit for use, e.—*Rape* (edible rooted), sow.—*Salsafy*, thin, &c.—*Savoys*, plant.—*Scorzonera*, thin, &c.—*Scurvy Grass*, sow.—*Seeds*, gather as they ripen.—*Small Salading*, sow.—*Spinach*, sow; hoe and thin.—*Stir* ground between plants.—*Succory*, sow.—*Ruta Baga*, sow; hoe advancing crops.—*Turnip Cabbages*, prick out.—*Vacant* ground, dig; cleanse from weeds, &c.—*Water* where necessary.—*Wormwood*, plant.

ORCHARD.

Budding, perform in all stone-fruit, apples, and pears; select cloudy weather.—*Espaliers*, continue to regulate (see *Wall Trees*); young ones head down.—*Fig Trees*, regulate; remove over luxuriant shoots.—*Pruning* (summer), complete.—*Raspberries*, clear from needless suckers.—*Snails* and slugs, search for morning and evening.—*Stocks*, clear from lateral shoots.—*Strawberries*, for forcing, lay in pots; *Vines* require constantly regulating; all late shoots remove; stop bearing shoots.—*Wall Trees*, continue to regulate as their shoots require; train in, do not shorten their shoots.—*Walnuts*, gather for pickling.—*Wasps*, entrap; bottles of sugared beer are best.—*Water* newly planted trees in dry weather; keep mulch round.

FLOWER GARDEN.

Auriculas, in pots, dress and water

frequently; seedlings transplant; old plants repot, e.—*Box* edgings, clip, b.—*Budding* of roses, jasmines, &c., complete.—*Bulbous Roots*, take up (see June); seeds sow.—*Bulbs*, autumn flowering, plant, e.—*Carnations*, attend to (see June); shade and shelter during hot weather; water freely, and give liquid manure.—*Chrysanthemum* suckers, separate and plant; lay.—*Cuttings* of some plants, as scarlet lychnis, will yet strike, b.—*Dahlias* require support and pruning.—*Edgings*, clip.—*Evergreens*, prune; seedlings, prick out.—*Grass*, mow and roll often.—*Gravel*, weed and roll.—*Heartsease*, plant slips, e.; water freely.—*Hedges*, clip.—*Hoe* and rake at every opportunity.—*Laying* carnations, &c., may be performed, b.; water freely; transplant rooted layers.—*Leaves*, decayed, remove as soon as seen.—*Liquid Manure*, give occasionally to flowering shrubs.—*Mignonette*, and a few other quick flowering annuals, may be sown, b., for autumn.—*Piping*, of pinks, &c., may be still practised, b.; pelargonium cuttings, plant, b.—*Polyanthuses*, seedlings, transplant; roots of old, part.—*Roses*, bud and lay, b.—*Seeds*, gather as they ripen.—*Stake* and tie up plants wherever necessary.—*Transplanting* perennials and biennials, complete, b.—*Water* freely, not only the roots but over the foliage.

HOT-HOUSE.

Air, admit freely every fine day.—*Dress* pots, &c., frequently, and give fresh earth if plants languish.—*Fumigations* of tobacco give frequently, especially if insects prevail.—*Liquid Manure* give to weakly plants.—*Orchidaceous Plants*, keep in coolest parts of the house, and give very little water, or they will not bloom well next spring.—*Pine Apples*, plant by crowns or suckers; gather ripe, early in the morning; shift succession for next season; give liquid manure; do not shift all at once, but at weekly intervals.—*Potting*, finish, b.—*Propagate* stove plants by cuttings, layers, and suckers, as suitable.—*Steam*, admit to plants.—*Vines*, when all the leaves are off, expose day and night; grapes, ripening late, require a moderate moist heat, and air only of a morning.—*Water* frequently and abundantly, but rather less to flowering plants than last month.

GREEN-HOUSE.

Air, admit freely to all plants detained in the house.—*Bud*, oranges, lemons, &c.—*Camellias*, syringe and water frequently; shade in hot days.—*Cuttings*, slips, &c., water.—*Dress* and give fresh earth as required.—*Heaths*, plant, slips.—*Layers* may be made.—*Moving* out of house (see June).—*Oranges* and *Lemons* require water daily; thin fruit if thick; remove blossoms where fruit is thick enough; give earth; air, admit freely.—*Peat* plants, examine almost daily to see that they do not dry.—*Propagate* by cuttings, slips, &c.—*Seedlings*, prick into small pots.—*Shade* during hot bright days; calico frames are best.—*Shifting*, complete, b.—*Stove plants* (hardier) may be moved into green-house.—*Stake*, trim, and train as required.—*Succulent* plants, cultivate by cuttings, slips, and suckers.—*Watering* and cleaning are now the chief occupations; apply water early in the morning by the engine.

JULY-FLOWER. *Prosopis juliflora*.

JUNE is also a busy month.

KITCHEN GARDEN.

Alexanders, earth up.—*Artichokes*, weed, &c.—*Asparagus-beds* clean, &c.—*Basil*, plant.—*Beans*, plant, hoe, &c., advancing crops.—*Beets*, thin, &c.—*Borecole*, plant.—*Brocoli*, plant.—*Cabbage*, plant; earth up, &c.—*Capsicum*, plant, b.—*Cardoons*, thin and plant out.—*Carrots*, thin, &c.—*Celeriac*, plant.—*Celery*, plant; earth up advancing.—*Coleworts*, sow for; plant.—*Coriander*, sow.—*Cress*, sow.—*Cucumbers*, sow, b.—*Earthing-up*, attend to.—*Endive*, sow, b.; plant.—*Fennel*, plant.—*Finocchio*, sow; earth up advancing crops.—*Garlic* is fit for present use.—*Herbs*, for drying and distilling, gather.—*Jerusalem Artichokes*, hoe, &c.—*Kidney Beans* (dwarfs), sow; (runners), attend to.—*Leeks*, thin, &c.; transplant, e.—*Lettuce*, sow; plant, &c.—*Mint*, plant.—*Parsnips*, thin.—*Peas*, sow; attend to advancing crops.—*Potatoes*, hoe, &c.—*Radishes*, sow.—*Rampion*, thin.—*Sage*, plant.—*Salsafy*, thin.—*Savoy*, plant; prick out.—*Scorzonera*, thin.—*Scurvy Grass*, sow.—*Seeds*, attend to and gather.—*Small Salading*, sow.—*Spinach*, sow; thin advancing.—*Slir Ground* between crops, in rows, &c.—*Succory*, sow.—*Tarragon*, plant.—*Thinning*, attend to.—*Tomatos*, plant out.—*Turnip Cabbage*,

sow; plant.—*Watering* and *Weeding*, attend to.—*Wormwood*, plant.

ORCHARD.

Ants, destroy; the ammonia water from gas-works, or boiling water poured into their haunts is effectual.—*Apricots*, finish summer regulating, b.—*Blighted Trees*, clean by the water engine; lime dust, &c.—*Budding*, commence in cloudy weather, or during evening, e.—*Fig Trees*, prune.—*Gooseberries*, *Currants* (Wall and Espalier), regulate, b.; remove blighted shoots; summer prune, e.—*Nectarines*, finish summer regulating.—*Newly planted Trees*, stake and fasten; give water in dry weather; liquid manure to the weakly; keep mulch round.—*Pears* (Wall and Espalier), properly regulate, b.—*Plums* (Wall and Espalier), properly regulate, b.—*Scarify*, trunks of hide-bound trees, rather than in winter, but this affection will never occur, if they are scrubbed in January with brine.—*Snails*, *Slugs*, search for, morning and evening.—*Strawberries*, water in dry weather.—*Thinning* fruit on walls, complete, b.—*Vines* before omitted, finish, regulating, b.; and those done in May re-examine.

FLOWER GARDEN.

Anemones, take up as leaves wither; dry and store.—*Annuals* (hardy and some tender), plant out to remain, in showery weather best; some (hardy) may be sowed, b.—*Auriculas*, continue shading; plant offsets; prick out seedlings.—*Baskets* or clumps, form of green-house plants.—*Biennials* and *Perennials*, sow, if omitted, b.—*Box* edgings clip; plant.—*Bulbous Roots* (Tulips, Jonquils, &c.), take up as leaves decay; remove offsets from; dry and store; may transplant some, or keep until autumn; (autumn flowering), as Colchicums, &c., take up as leaves decay, separate offsets, and replant, or not, until end of July.—*Carnations*, in bloom, attend; aid the bud-pod to split with a pair of narrow sharp-pointed scissors; water every second day; tie to supporters, &c.; prick out seedlings; make layers; pipe.—*Cyclamens*, transplant.—*Dahlias*, finish planting out, b.—*Dress* the borders assiduously; neatness now stamps a gardener's character.—*Fibrous* rooted *Perennials*, propagate by cuttings of flower-stalks;

shade and water.—*Flowering Plants* generally require training and support.—*Grass*, mow, roll and trim edges.—*Gravel*, weed, sweep, and roll.—*Guernsey Lilies*, take up; separate offsets, and replant. Do this every second year.—*Hedges*, clip, e.—*Leaves* and stems decaying, remove as they appear.—*Liquid Manure*, apply occasionally to all choice flowers.—*Mignonette*, plant out; sow, b.—*Pink seedlings*, prick out; make layers.—*Pipings* (or Cuttings) of Carnations and Pinks may be planted.—*Potted Flowers*, dress, stir earth and water regularly.—*Ranunculuses*, take up as leaves wither, dry and store.—*Roses*, bud, lay, and inarch; fumigate with tobacco to destroy the Aphis, or Green Fly.—*Salvia Patens*, pinch down centre stem to make it flower bushy.—*Seedlings* of Perennials and Biennials, transplant.—*Seeds* (ripe), gather in dry weather.—*Seed Vessels*, remove, to prolong flowering.—*Water*, give freely and frequently to all newly moved plants, and to others in dry weather; early morning best time.

HOT-HOUSE.

Air, admit freely during every mild day; but exclude as evening approaches.—*Bark Beds*, occasionally will require stirring; water and ventilate freely.—*Grapes*, thin; ripening keep dry.—*Heat*, keep up as required.—*Pines* are now ripening; plant crowns as they occur; give liquid manure; syringe; shade in very hot days.—*Propagation*, continue as requisite, by seed, suckers, slips, layers, cuttings, offsets, &c. (See May).—*Steam*, admit almost daily.—*Strawberries* done forcing, allow to dry; remove into larger pots with new earth, and keep for second forcing.—*Syringe Pines*, and other plants, frequently.—*Tobacco* fumigations, give occasionally.—*Vines*, push forward by warmth, liquid manure, &c.; mulch round roots outside the house; stop laterals.—*Watering* attend to duly; it is required generally oftener and more liberally than in preceding months; apply it in the morning early.

GREEN-HOUSE.

Air, give with all possible freedom; bring all but the tenderest out of the house.—*Camellias*, done flowering, remove into higher temperature.—*Cuttings* of various plants may now be in-

serted.—*Dress* the plants as they are brought out of the house.—*Earth*, give fresh, and liquid manure, as necessary.—*Flowering shrubs*, shade.—*Geraniums*, plant cuttings.—*Head* down and prune irregular growing shrubs.—*Heaths*, plant slips; water frequently.—*Inarching* of jasmines, oranges, &c., may be performed.—*Leaves* (decayed), remove, and wash the foliage generally.—*Layers* of shrubs generally make.—*Mowings* of grass spread over surface of earth in large pots or tubs—an excellent mode of arresting evaporation.—*Myrtles*, propagate by cuttings, e.;—*Oranges* and *Lemons* in bloom, give liquid manure; thin blossom when in clusters.—*Rain*, if excessive, move tenderest plants back into the house; and tilt the pots of others.—*Seedlings*, transplant.—*Shift* into larger pots, as necessary, b.—*Succulent* plants propagate by cuttings; remove to outside, e.—*Water* frequently, but moderately; some plants require it every morning or evening.

JUNIPERUS. Juniper. Nineteen species besides varieties. Hardy evergreen trees and shrubs. Seed and cuttings. Sandy loam. See *Coniferae*.

JUPITER'S BEARD. *Anthyllis barba-jovis*.

JUSTICIA. Sixty-four species. Stove and green-house plants; some shrubs, others biennials and annuals, and a third group trailers. The biennials and annuals require to be sown in a hot-house or hotbed; the others are increased by cuttings, and all delight in light loam and peat.

KAGENECKIA *cratagoides*. Half-hardy evergreen tree. Cuttings. Sandy loam and peat.

KALANCHOE. Seven species. Stove evergreen shrubs. Cuttings. Loam and peat.

KALE. See *Borecole*.

KALMIA. Five species and more varieties. Hardy evergreen shrubs. Seed and layers. Sandy loam and peat.

KALOSANTHES. Eight species. Green-house evergreen succulents. Cuttings dried for forty-eight hours; sandy loam and peat.

KANGURU VINE. *Cissus antarcticus*.

KAULFUSSIA *amelloides*. Hardy annual. Seed. Sandy loam.

KELP is the ash remaining after seaweed is burnt, and has been used with great advantage as a manure to pota-

toes, brocoli, and other species of brassica. It is composed of carbonate of soda, and iodide and bromide of potassium, carbon, sulphates of lime and magnesia, and other matters of trivial importance. See *Green Manure*.

KENNEDY A. Fifteen species. Green-house evergreen twiners. Cuttings. Sandy loam and peat.

KERRIA japonica. Hardy deciduous shrub. Young cuttings. Common soil. More commonly called *Corchorus japonicus*.

KIDNEY-BEAN. *Phaseolus vulgaris*. Haricot, Fr. Schminkbohne, Ger. Judias, Span. Faguiolo, Ital.

"Of the Snap-Short Bean, the Haricot of the French, the varieties and sub-varieties are numerous. Those enumerated in the Catalogue annexed, are such as we esteem most worthy; they consist of the earliest, the latest, and those which ripen intermediately. The Early Mohawk or Brown Six Weeks arrives soonest at perfection, and is the hardiest of the early ones; the Early Yellow, Red Speckled Valentine, and China Red Eye, immediately succeed. The Red French is about the latest: the other varieties ripen promiscuously. All the kinds are brought to the Philadelphia market; some purchasers preferring one, and others another. The Red Speckled Valentine is a variety very generally admired; it is round podded, without strings, an abundant bearer, and remains tender longer than most others. The Brown Valentine or Refugee, is also an excellent variety, as also the China Red Eye. The pods of the Red French are used as well for pickling as boiling, and the beans throughout the winter in a dry state, as haricots, and in soups, for which it is usually preferred.

"The usual plan of cultivating this tribe, is in drills double or single, placing two seeds together at intervals of two or three inches: two to two and a half feet should be allowed between the drills. They are much more tender than the Long Pod or Windsor, and will not succeed, if planted before the weather has become somewhat settled, and the earth warm; in the latitude of Philadelphia, not earlier than April, unless in very dry ground, and protected situations. To have a constant supply, it will be ne-

cessary to plant successive crops at intervals of two or three weeks, which is much preferable to planting but seldom, and then a larger quantity. Plantations made so late as 1st August, generally succeed and yield abundantly.

"When they have risen three or four inches, give them a careful hoeing, to destroy all weeds, and loosen the earth. At this time, or shortly after, draw towards the base of the plants, some of the loose soil, to the depth of one or two inches. This process is termed "*landing*," and is highly beneficial in protecting the roots from excessive drought, and the direct rays of the sun. As the crop approaches maturity, nothing more is required than an occasional hoeing, observing always to keep the ground free from weeds.

"In selecting a spot to plant beans, choose where the soil is light and tolerably dry. If it be poor, apply a good dressing of well rotted manure, either spread over the entire surface, or placed in the drills when drawn out."
—*Rural Register*.

Forcing.—The hot-bed must be of moderate size, and covered with earth nine inches thick. When the heat has become regular, the seed may be inserted in drills a foot apart, and the plants allowed to stand six inches asunder in the rows. Air must be admitted as freely as to the melon. The same precautions are likewise necessary as to keeping up the temperature, taking the chill off the water &c., as for that plant. When the seed begins to sprout, the mould should be kept regularly moistened; and when grown up, water may be given moderately, three times a week. The temperature should never be less than 60°, nor higher than 75°. Some plants of the hot-bed sowing at the end of March, are often, after being gradually hardened, planted in a warm border: this will at most hasten the plants in production a fortnight before those sown in the open ground in May.

Those sown under frames in March for transplanting into a border, when two or three inches in height, must in a like manner be hardened gradually for the exposure, by the plentiful admission of air, and the total removal of the glasses during fine days. If any are raised in pots in the hot-house, they must in a like manner be prepared for the removal, by setting them outside in

fine days, and there watering them with cold water.

If the season is too ungenial after all to remove them even to a warm border, the plants are often inserted in patches, to have the protection of frames or hand lights at night, or as the weather demands.

Said to be perennial.—It has been stated, that kidney beans appear of a perennial nature, and that they have been observed to vegetate for several years—the plants being in the vicinity of a steam-engine, and so situated that the frost could not penetrate to the roots.

BEANS, Pole.—The Scarlet Runners, and White Dutch Beans, are very delicately flavoured, and are used either in the pod, or shelled when further advanced; but in this section of the country, and perhaps further South, they bear so sparingly most seasons, as to be scarcely worth cultivating.

The Lima is too well known to need description. Two varieties are cultivated; the one broad and thin, the other much thicker. We have sometimes thought the latter the more tender and delicate when boiled. The Lima Bean is very tender, not bearing the slightest frost, and is very subject to rot when planted early, or during a spell of rainy or damp cool weather. To guard against which, the best plan is to sprout them in a frame, (as recommended for the Long Pod or Windsor,) so situated, that the damp and frost can be excluded. An old hot-bed answers the purpose effectually. They need not be planted therein, before the middle of spring, nor transplanted till towards its close; a little earlier or later, as the weather may make expedient; if planted early, they will at best remain stationary, and may, perhaps, do worse. They should be planted in hills in well cultivated ground, dressed either in the piece or hills, with thoroughly rotted manure from the barn-yard. The hills should be raised three or four inches above the average level, and be three feet apart each way, with a pole six or eight feet high, well secured in the ground, to each hill. Three plants in a hill are sufficient. As the vines shoot up, they should be tied to the poles, till they get hold, when they will support themselves. In trying them, observe to do it in the direction in which they incline

to clasp the pole, which is contrary to the course of the sun, and opposite to the habit of most climbers.

Those who have not the convenience of a frame, (or hand-glass which will answer the same purpose,) should have the hills prepared and poles inserted, choosing a mild, dry time, about the close of May, for planting the beans. If wet weather should immediately succeed, and the seed rot, replant as soon as the ground dries. Good crops have been produced in the vicinity of Philadelphia, when planted even so late as first of June.

After they become well established, and have clasped the poles, no further care is requisite, other than keeping the weeds under, and the hills occasionally stirred.

The Carolina or Sewee bean, is of a smaller size than the Lima; much hardier, rather earlier, and more productive, but generally considered less rich. In other respects they closely resemble each other—time and mode of planting may be a little in advance of the Lima—cultivation precisely the same.—*Rural Reg.*

BEANS, English. *Vicia Faba*, of *Linnaeus*. *Fève de marais*, *Fr.* *Bohn*, *Ger.* *Fava*, *Ital.* *Habas*, *Span.*

Of the above kind, commonly called in this country "Horse Bean," there is considerable variety; two of them have been selected by us for cultivation, believing them the best adapted for the climate, and quite sufficient of the kind. They are the Early Long Pod and Broad Windsor. Both succeed with the same treatment, but the first named, is the more certain bearer of the two. In England, where they are extensively cultivated, they do much better than in this country, preferring its damp cool atmosphere, to our frequently dry and hot one; to counteract which, it is desirable to plant so early in the spring, as the ground will admit of being worked; in the latitude of Philadelphia, (39° 57') the latter part of February, or beginning of March, if possible; they then come into flower before the weather becomes hot, otherwise the blossoms drop, and set no fruit.

Plant them in drills, either single or double, two inches apart in the drills, and cover one to two inches deep. If in double drills, with alleys two and a half feet wide. If in single rows, two

feet alleys answer, unless it be intended to cultivate them with the horse hoe, as is done by market gardeners.

Those who are particularly fond of this bean, can accelerate the crop, by setting a frame at the close of winter, under the lee of a board fence, or other protected situation, exposed to the sun, which cover with glass, and in severe weather with matting or straw, so as effectually to exclude the frost. Herein plant the beans, one seed to the square inch, and let them remain, until the arrival of milder weather, when they should be transplanted to the position in the garden which it is intended they shall occupy. In transplanting them, care should be taken not to injure the roots, to guard against which, use a trowel to ease them up, and suffer as much earth as will, to adhere. During the time they remain in the frame, the sash should be raised when the weather is mild, to admit the air, and gradually harden them, preparatory to full exposure when transplanted, else the sudden change of temperature might prove fatal. In order to make them set fruit more certainly, it is the practice to nip off the top or leading shoots when they are in full flower; this checks the growth, and directs the strength of the plant towards the blossoms. If a part of the flowers are destroyed in this operation, there is no loss.

Whilst the crop is growing and progressing towards maturity, keep the ground well hoed, and free from weeds. When the plants have attained six or eight inches in height, draw towards their base a portion of loose earth, which will encourage them to put forth fresh fibres, and protect the roots already formed, from the sun's rays.—*Rural Register*.

KIRGANELIA elegans. Stove evergreen shrub. Ripe cuttings. Loam and peat.

KITAIBELIA vitifolia. Hardy herbaceous. Seed. Common soil.

KITCHEN GARDEN.

Situation of the Kitchen Garden.—In selecting the site, and in erecting the inclosures, as well as in the after preparation of the soil, the ingenuity and science of the horticulturist are essentially requisite. He will be called upon to rectify the defects and to improve the advantages which nature affords; for it is very seldom that the natural situation

of a mansion, or the plan of the grounds, allows him to construct it in the most appropriate spot.

A gentle declination towards the south, with a point to the east, is the most favourable aspect; to the north-east the least so: in short, any point to the south is to be preferred to one verging towards the north. A high wall should inclose it to the north and east, gradually lowering to the south and west. If, however, a plantation or building on the east side, at some distance, shelter it from the piercing winds, which blow from that quarter, and yet are at such a distance as not to intercept the rays of the rising sun, it is much to be preferred to heightening the wall. It is a still greater desideratum to have a similar shelter, or that of a hill on the south-west and north-west points. The garden is best situated at a moderate elevation; the summit of a hill, or the bottom of a valley, is equally to be avoided. It is a fact not very difficult of explanation, that low lying ones are the most liable to suffer from blights and severe frosts; those much above the level of the sea are obviously most exposed to inclement winds.

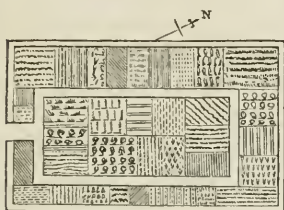
Size of the Kitchen Garden.—To determine the appropriate size of a kitchen garden is impossible. It ought to be proportionate to the size of the family, their partiality for vegetables, and the fertility of the soil.

It may serve as some criterion to state, that the management of a kitchen garden occupying the space of an acre, affords ample employment for a gardener, who will also require an assistant at the busiest period of the year. In general, a family of four persons, exclusive of servants, requires a full rood of open kitchen garden.

Plan of the Kitchen Garden.—In forming the ground plan of a kitchen garden, utility is the main object. The form and aspect represented in the accompanying sketch are, perhaps, as unobjectionable as any, since none of the walls face the north, and consequently the best aspects are obtained for the trees. A narrow path two feet wide should extend round, adjoining the wall, and then a border about ten feet, the widest on those broad sides that face the south, which not only is beneficial to the trees, but convenient for raising early crops, &c. Next to

this should be a walk five feet in width, likewise extending round the area.

Fig. 95.



Respecting the inclosure of the kitchen garden, see *Hedges and Walls*.

KLEINHOVIA hospita. Stove evergreen tree. Cuttings. Peat and loam.

KNIFE. Of this the gardener requires several kinds. 1. *Garden Knife*, with a curved blade, for common rough purposes. 2. *Pruning Knife*, with a straight blade, and fine edge. 3. *Grafting Knife*, also straight-bladed, but with a thinner and narrower blade. 4. *Budding Knife*, is like the grafting knife, but should have a double-edged sharp point, like an oyster-knife, and the handle of ivory, is wedge-shaped, for raising the bark from the wood. There is a variety of superior excellence, called *Curtis's Budding Knife*. 5. *Asparagus Knife*, has either a strong straight blade, with a sharp chisel-shaped point, or a slightly curved blade, with a saw-edge on the inner side of the curve.

KNIGHTIA excelsa. Green-house evergreen tree. Cuttings. Loam, peat, and sand.

KNOXIA. Four species. Stove evergreen shrubs, except *K. laevis*, which is annual. The former are increased by cuttings. Sandy loam and peat.

KOLREUTERIA paniculata. Hardy deciduous tree. Layers and root-cuttings. Sheltered common soil.

KONIGA maritima, var. *variegata*. Green-house evergreen shrub. Cuttings. Common soil.

KRAMERIA pauciflora. Stove evergreen shrub. Cuttings. Sandy loam and peat.

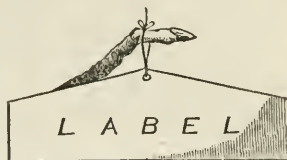
KRIGIA. Two species. Hardy annuals. Seed. Sandy loam.

KUHNIA. Four species. Two hardy, and two green-house herbaceous. Division. Sandy loam and peat.

KYDIA. Two species. Stove evergreen shrubs. Cuttings. Sandy loam and peat.

LABEL. That which combines durability with facility of reference and cheapness, is a small piece of deal, planed smooth, painted white, and written upon with a lead pencil.

Fig. 96.



When required for a seed-bed, a small stake is to be driven into the ground, and from it the label to be suspended.

LABICHEA. Two species. Green-house shrubs. Cuttings. Sandy loam and peat.

LABLAVIA. Six species, besides varieties. Stove and green-house twiners. Four annuals, the rest deciduous. Annuals sow in pots in stove, seedlings plant out at end of May. Deciduous by cuttings. Common soil.

LABURNUM. *Cytisus Laburnum*.

Varieties. — Common Broad-leaved Laburnum; Narrow-leaved long-spiked Laburnum; Short-spiked Laburnum; Variegated-leaved Laburnum, and Middle-sized Laburnum (*C. L. intermedium*). The first two of which varieties are tolerably permanent from seed, but the other two must be continued by cuttings.

Propagation.—By Seed.—The seed grows freely in the open ground, and should be sown in March, in four-foot beds, drilling it in half an inch deep; they will come up in six or seven weeks. Keep them weeded during summer; and in spring following the seedlings in general, if they stand very close, may be transplanted into the nursery in rows, two feet distance, allowing them more room as they advance in growth; and here they may remain two, three, or four years, till large enough for the shrubbery.

By Cuttings.—October or November is the best time for planting them. Choose young shoots eight, ten, or twelve inches long; plant them in rows, a foot apart, and five or six inches in

the lines; and they will be rooted in one year.

All the culture these plants require in the nursery, is to keep them clear from weeds, and to hoe frequently the ground between the rows.—*Abercrombie*.

LABYRINTH is an arrangement of walks, inclosed by hedges or shrubberies, so intricate as to be very difficult to escape from. From the twelfth century to the end of the seventeenth, they were a very favourite portion of English pleasure grounds, but they are now more judiciously banished.

LACHENALIA. Thirty-five species. Green-house bulbs, except *L. glauca*, which is hardy. Seed and offsets. Sandy peat.

LACHNANTHES tinctoria. Green-house herbaceous. Seed and division. Sandy peat.

LACKEY MOTH. See *Clisiocampa*.

LACTUCA. Lettuce. Seven species, and many varieties. Hardy annuals. Seed. Common rich soil. See *Lettuce*.

LADY'S FERN. *Aspidium thelypterum*.

LADY'S MANTLE. *Alchemilla*.

LADY'S SLIPPER. *Cypripedium*.

LADY'S SMOCK. *Cardamine*.

LADY'S TRESSES. *Neottia spiralis* and *spiranthes*.

LÆLIA. Sixteen species. Stove epiphytes. Offsets. Peat and potsherds. Mr. Beaton gives the following directions for the treatment of *L. superbiens*, and they are applicable to the rest of the genus:—

“In April, place it in the warmest end of the green-house, and there let it remain till all its shoots are three parts grown, about the end of June; then place it in the stove, and let it have as much air as possible, watch its buds narrowly, and leave it in the stove till they are in a forward plump state, then remove it to a cooler place, and allow it to go gently to rest as the season declines. If all has gone on well with it, the flower spikes will make their appearance as soon as it is at complete rest in November: at this time the same heat given to the camellia suits it best, so that it may safely be taken to the drawing room for the winter, and having previously finished its growth, little or no water need be given it while in the drawing room.”—*Gard. Chron.*

LÆTIA thamnica. Stove evergreen shrub. Cuttings. Rich loam and peat.

LAGASCA mollis. Stove annual. Seed. Common soil.

LAGENARIA vulgaris. See *Gourd*.

LAGERSTREEMIA. Four species. Stove evergreen shrubs, and one variety, *L. indica rosea*, for the green-house. Cuttings. Peat and loam.

For the culture of *L. indica*, Mr. R. Reid gives the following directions:—“It should be kept all winter in the green-house, or even the back sheds will do perfectly well, and no water should be given to it. About the middle or latter end of April, it will begin to grow, when the young shoots may be thinned out, and the remainder shortened a little; the plant should then be placed in the stove or vinery, where there is a brisk heat. It will grow vigorously till June, and will then appear as if it had done growing for the season, but in a few weeks, when the young shoots are well ripened, it will make a second push at the extremity of every young shoot. These are the flowering shoots; and by the month of August it will be loaded with its beautiful tresses of purple flowers.”—*Gard. Chron.* On light well drained soils and sheltered locations in Pennsylvania, the *Lagerstræmia* supports the winter—further south it is seen in great luxuriance, fifteen or twenty feet in height.

LAGETTA linearia. Stove evergreen shrub. Ripe cuttings. Loam and peat.

LAGONYCHIUM stephanianum. Half-hardy evergreen shrub. Seed, cuttings, and layers. Common soil.

LAHAYA. Ten species. *L. alsinifolia* and *L. minuartoides* are hardy; *L. diffusa*, a green-house, annual trailer; the others green-house and stove evergreen shrubs, except *L. polycarpoides*, which is herbaceous. These are increased by cuttings. Sandy peat.

LALAGE ornata. Green-house evergreen shrub. Young cuttings. Sand, loam, and peat.

LAMBERTIA. Eight species. Green-house evergreen shrubs. Cuttings. Sandy loam and peat.

LAMB'S LETTUCE, or **CORN SALAD**, (*Valerianella olitoria*,) is grown for winter and spring salads. The first dish formerly brought to table, was a red herring set in a corn salad.

Soil and Situation.—It will flourish in

any soil that is not particularly heavy; the best is a sandy moderately fertile loam, in an open situation.

Time and Mode of Sowing.—Seed may be sown in February and the two following months, and once a month during the summer, if in request; but it is not so palatable during this season. Lastly, during August and early in September, the plants from which will be fit for use in early spring, or during the winter, if mild. Three sowings are in general quite sufficient for a family, viz., one at the end of February, a second early in August, and a third early in September.

The seed sown in drills, six inches apart. The only cultivation required is the keeping the plants free from weeds by frequent hoeings, they being previously thinned to four inches asunder. They should always be eaten quite young. In summer, the whole plant may be cut, as they soon advance to seed at this season; but in spring and winter the outer leaves only should be gathered, as directed for spinach.

To obtain Seed.—Some of the spring-raised plants must be left ungathered from. They flower in June, and perfect their seed during the two following months.

LAMIUM orvala. Hardy herbaceous. Seed and division. Common soil. Some varieties of *L. longifolium* and *L. rugosum* are also cultivated in gardens.

LAMPWICK. *Phlomis lychnitis*.

LAND-DITCHING. See *Draining*.

LANDRA. *Raphanus landra*.

LANDRETH, David, was a native of England, the son of a farmer of Berwick upon Tweed. Early in life his attention was attracted by plants and flowers, and yielding to his fondness for them, and impulses which they only who love nature can fully appreciate, he determined to adopt gardening as a profession. At that day the art was less widely and ardently pursued than at the present, and the sources of information, and consequent means of improvement, were limited. Then publications on the subject were not, as now, of almost daily issue. Periodicals on gardening and rural affairs were unknown; and, save the works of Miller, there was scarcely one for reference. Since then Horticulture has assumed its rightful place as a delightful if not a

fine art, cherished and pursued by the intellectual and refined.

The subject of this sketch, after having availed himself of the usual routine of practice in the neighbourhood of his birth-place, as a mean most likely to promote his views, and extend his knowledge of the more approved rules of the profession which he had espoused, removed to the vicinity of London. Here he profited by an observance of the operations in the extensive nursery establishments and pleasure-grounds around the metropolis; and, having prepared himself for the efficient practice of his art, embarked for America. The hostilities between the mother country and her colonies, then existing, prevented his sailing for a middle port, and he accordingly took passage for Quebec, where he resided for three years. On the conclusion of the war, his longing desire to remove to a southern point, and climate more genial to his pursuit, could now be gratified; and in the autumn of 1784 he arrived in Philadelphia, the spot towards which his eye had been unwaveringly directed—but why, he has been heard to say, he could not tell. There all were strangers. Within its wide extent there did not live a solitary being with whom he could claim acquaintance, much less friendship. How many have since followed from their father-land, and found peaceful and happy homes!

With a pocket but scantily supplied, and winter approaching, when but little employment in his line could be expected, he availed himself of a temporary engagement. It was not long, however, ere his qualifications and correct deportment secured the favourable notice of Robert Morris, the distinguished revolutionary patriot, in whose employment he entered, and continued for several years, and with whose regard he was honoured until the close of Mr. Morris' eventful life.

Mr. L., on relinquishing the employment of Mr. Morris, was enabled to carry out his long-cherished and original design of establishing himself as a Nurseryman; and shortly thereafter laid the foundation of what has been known throughout the Union, for more than half a century, as the "Landreth Nurseries." He ultimately associated with himself a younger brother, Cuthbert, who had followed him to America,

and their united efforts enabled them successfully to conduct what was then considered an extensive business. A scrupulous regard to what was due to others secured respect and moderate competency.

To the brothers Landreth, Philadelphia is, in a degree, indebted for the early development of horticultural taste, and in the facilities which they afforded for its gratification the whole Union has participated. Their productions, ornamental and useful, have been distributed far and wide. Specimens of fruits and flowers from their grounds exist in almost every town and hamlet in the country. The earliest collection of Camellias in America was made by them, and their importations of valuable plants and fruits were extensive. Their collection of indigenous plants, obtained through the agency and friendship of traveling collectors, and local correspondents, was, perhaps, the largest of its day, if we except the magnificent one of the Bartram Botanic Garden.

How vast have been the enlargement of horticultural taste, and the means of gratifying it since Mr. Landreth first embarked in his floral enterprise! Then a green-house, or, as it was popularly termed, a "glass-house," was an object of amazement, and a simple rose, exhibited in a window budding and blooming "out of season," attracted a wondering crowd. Now a residence in town or country is scarcely considered perfect which does not embrace at least a room prepared for the preservation of plants; and the thousands who throng the exhibitions of our Horticultural Society evince the extent of interest on the subject.

The temperate and regular habits of Mr. Landreth promoted health, and protracted life beyond the ordinary term. In manners he was plain and unobtrusive; his temperament ardent, actively sympathizing with the afflicted, or warming with indignation at oppression. His fondness for plants increased with age, and, though their culture was the source of his support, he loved them for themselves alone. "Trade" was, with him, an adjunct to the gratification of a refined enjoyment. Never did painter look upon his canvas, in glorious enthusiasm for his art, with an eye more abstracted from the lucre which his pencil brought, than did David Lan-

dreth in the contemplation of his floral family. A beautiful plant, a noble tree, or a landscape decorated by the hands of nature or of man, were to him objects of the purest pleasure. After an active and well-spent life, and with an enviable reputation, he died on the 22d August, 1836, aged 84.

LANDSCAPE GARDENING, as its name intimates, is the composition of beautiful scenery, so that all artifice is concealed by the blending of trees, shrubs, ground, and water: thus forming vistas gratifying as those which occur naturally. Admiration for such scenery is an innate quality of the human mind; and successfully to imitate such scenery requires judgment as well as taste. It is not possible, without an enormous outlay, to introduce any species of landscape beauty upon a given plot of ground. There is the beauty of the level surface, quite unattainable upon a surface which is abrupt and broken. The beauty of the clay districts is not to be secured upon those of the chalk; neither on light uplands can be arranged the dense beauties of well-watered alluvions. "Consult the genius of the place" is an axiom which has been derided, but which is dictated by the soundest sense.

A writer upon the general principles of landscape gardening has some very judicious remarks, from which the following are extracts:—

"Although due light and shade are necessary to bring out striking effects, colour must be attended to. Light and shade, we all know, when the sun shines, vary every moment; and therefore it becomes a study so to assort objects, within range of the principal point of view, as to bring out various good effects. Not only must we regard the diurnal motion of the sun, but his position in the ecliptic; so that when he is at various elevations and positions, light may make the lights and shadows spread out where they may make the strongest impression on the eye.

"This is a point not much attended to, but one of the greatest value, and well deserving the closest study by the landscape-gardener. Frequently the admission, at a particular spot, of a mere streak of light enlivens a whole scene, and excites the highest admiration. Sunshine through trees, when the orb itself

is concealed, and the rays are penetrating, a thin shower falling among them, produces at times delightful effects.

“The variety of green tints is very great, and their disposition of importance. Green is a mixture of blue and yellow, and the predominance of either must be studied. A different suit of colours appears in the autumn, the yellow prevailing, but mixed with red instead of blue, which seems to disappear from the tints of autumn. Some trees change colour early, as the horse-chestnut; others late, as the beech and oak. Advantage should be taken of this, and trees arranged accordingly. Evergreens should generally be so disposed as to form a mass when other trees are naked; but, in some situations, single pines and firs, if room be given to them, produce a fine effect.

“When a house is to be built where trees already abound, difficulties will occur in choosing a site. It is dangerous to cut down trees before the building has been erected; and yet effects may not be brought out, so as to assist in the choice, without thinning. It is also difficult to conduct roads where trees stand thickly; in such a case the landscape-gardener should proceed with great caution, removing first such trees as are not in themselves worthy of a place.

“The disposition of water, where sheets of it are to be interspersed with trees and shrubs, has a fine effect in certain situations when managed with judgment. But we cannot teach judgment any more than taste, both being gifts of nature.

“Of all things connected with landscape-gardening, buildings are often most offensive; and we find the grossest defects of taste frequently displayed both in their style and position. Many persons are apt to associate external nature with the state of society in time long past. This is an error that has led to many trespasses against nature's rule. A man will build a castle because the situation he fixed for it is a commanding one, and would have answered all the purposes of defence in a rude state of society. His taste leads him into expense, and to the sacrifice of convenience and comfort. The adoption of former styles shows taste in some instances; but we rather think it

an indication of want of invention. The country is covered with new residences in the Elizabethan style; and there is a sameness that is rather tiresome, and far from being so picturesque as the castellated, with all its modern incongruities.

“Dwelling-houses should be arranged for comfort, and, where means are at command, also for elegance and grandeur, both internally and externally.

“The ruins of ancient buildings produce a most pleasing effect, and they ought to be preserved; but it would be preposterous in our day to build that which is felt to be impressive only when in a state of ruin. This is a subject not altogether separated from landscape gardening.

“When a professor finds buildings in his way, it is his business either to hide them or to exhibit them to the best advantage.”—*Gard. Chron.*

Under this general head it would be misplaced to enter more fully into details; for these will be found, under their appropriate titles, in other pages, and chiefly borrowed from Mr. Whateley, who has published more correct views upon the art of tastefully arranging grounds than any man who has ever written upon the subject.

A taste for landscape-gardening, like that for the higher order of painting, sculpture and other fine arts, is the slow product of wealth and easy leisure, and is distinct from a love of flowers evinced alike by the young and the aged, the intellectual and the illiterate. In the United States, as might be expected in a new country, the mass are too busily engaged in the every day cares of life to devote attention to such objects—but few comparatively, “the architects of their own fortunes,” have acquired the means to indulge in luxurious expenditures. We are, however, acquiring taste on this and kindred subjects, and with the increasing wealth, the general education and superior intelligence which characterize the American people, there can be no doubt that long before we can be called an old nation, our tastes will have been refined, and our capacity to appreciate the beautiful largely developed. Already we have evidence of “the march of improvement,” as exhibited in the pretty cottages, with their decorated grounds, around our towns and cities;

an onward step towards that which in portions of Europe, especially in England, gives such charm to the country, and to country life.

Those who wish to consult works on Landscape Gardening and Rural Architecture, almost indivisible, are referred to Loudon's "Encyclopædia of Cottage, Farm and Villa Architecture," Loudon's "Suburban Gardener," Downing's "Landscape Gardening," Downing's "Cottage Residences," &c.

LANTANA. Twenty-nine species. Stove evergreen shrubs. Cuttings. Sandy loam.

LARIX. Larch. Two species, and many varieties. Hardy coniferæ. Seed. Light soil on a dry sub-soil. See *Coniferae*.

LARKSPUR. *Delphinium*.

Propagation and Culture.—The annual sorts and varieties are sown annually in September or October, or early in spring, in patches where the plants are to flower—for they do not succeed by transplantation—observing, that those of the autumn sowing grow stronger, flower earlier, and the flowers are generally larger and more durable than the spring-sown plants. It is, however, proper to sow some in spring, in February or March, to continue a longer succession of bloom.

"Dig with a trowel small patches, about nine inches diameter, in different parts of the borders towards the middle, as also in the fronts of the shrubby clumps; and in each such patch sow eight, ten, or twelve seeds a quarter of an inch deep; and when the plants are an inch or two high, thin those of the unbranched sorts to about six or eight in each patch, and of the branched kinds to three or four in each place, which is all the culture they require. But when intended to show in beds by themselves, they are commonly sown in drills, forming them lengthwise, the beds a foot asunder, and half an inch deep. The unbranched kinds are the best adapted for this mode of culture.

"The perennial sorts are also raised plentifully from seeds sown in autumn or spring, in a bed or border of common earth, for transplantation when the plants come up. Hand-weed them occasionally, and thin them to three or four inches distance, to remain till October or November; then plant them out where they are to remain to flower.

Their roots will endure many years." —*Abercrombie*.

LARREA. Two species. Green-house evergreen shrubs. Cuttings. Loam, peat, and sand.

LASER-WORT. *Thapsia laserpetii*.

LASIAN DRA. Three species. Stove evergreen shrubs. Cuttings. Loam, peat and sand.

LASIOPETALUM. Two species. Green-house evergreen shrubs. Ripe cuttings. Loam and peat.

LASIOSPERMUM. Five species. Hardy evergreen trailers. Cuttings. Sandy loam.

LASTHENIA. Two species. Hardy annuals. Seeds sown in autumn. Common soil.

LATANIA. Three species. Stove palms. Seed. Rich loam, abundantly watered.

L A T E R A L S, or side shoots, are those which spring from the sides of the main branches, and are thus described in contradistinction to the terminal or leading shoots of the branches. The laterals on the lower branches, like those branches themselves, are usually longer as they approach the base of the tree, because they extend to obtain the benefit of the light kept from them by the branches above. If unable thus to extend, as in the case of inner trees of those planted in clumps, the laterals die, and occasion the denudation of their trunks. If the terminal shoot be cut away, the laterals increase more in length, not only because more sap is thus afforded them, but because an extra effort is made to advance into the desired degree of light.

L A T H Y R U S. Fifty-four species. Chiefly hardy perennial climbers, among which is the Everlasting Sweet Pea: but many are annuals. Seed. Common soil.

LAUREL. *Laurus*.

LAUREL CHERRY. *Cerasus lauro-cerasus*.

LAURESTINUS. *Viburnum tinus*.

LAURUS. Twenty-five species. Hardy, green-house and stove, some evergreen, others deciduous. This genus includes the laurel, bay, benzoin, and sassafras trees. Layers and cuttings. Sandy loam.

Pruning.—The best month for pruning the common laurel, and probably the whole of the evergreens of this genus, is April.

LAVANDULA. Lavender. Ten species. Hardy and half-hardy evergreen shrubs. Cuttings. Light gravelly loam. *L. Spica.* Common Lavender.

Soil and Situation.—A poor and light soil is best suited to this plant, being in such, more fragrant, longer lived, and more capable of enduring severe weather. In rich or moist soils it grows luxuriantly, but is in general destroyed during the winter. The situation cannot be too open.

Time and Mode of Planting.—It is propagated by slips and cuttings of the current year's shoots, planted in May and June, as well as by cuttings of those which are a year old; to be planted in March, April, and early May. Both slips and cuttings must be from five to seven inches in length, which, after being stripped to half their length of the lower leaves, are to be planted to that depth either in a shady border, or in any compartment, to have the shade of a mat during mid-day until they have taken root, in rows six inches apart each way. Water must be given in moderate quantity every evening until thus established.

Having attained sufficient strength, they may be moved to their final stations in September or October, which is the season to be preferred, or they may be left until the succeeding spring. If it is grown in considerable quantity for medicinal purposes, which is the only claim it has for a place in the herbary, it must be planted in rows two feet apart each way, otherwise only detached plants are inserted along the borders. The only after-culture required is the occasional employment of the hoe, the decayed spikes and branches being removed in autumn, and the surface gently stirred with the spade in the spring.

The flowers are ready for gathering, either to dry or for distillation, in July or the end of June.

LAVATERA. Twenty-five species. Some hardy herbaceous, increased by seed and division, in common soil; and the annuals and biennials may be spring-sown in the same. The greenhouse and half-hardy are propagated by ripe cuttings in sandy loam.

LAVENDER. *Lavandula.*

LAVENDER COTTON. *Santolina.*

LAVRADIA *montana.* Stove ever-

green shrub. Cuttings. Loam, peat and sand.

LAW RELATING TO GARDENS.

The following exposition of existing laws in Great Britain may as a matter of curiosity interest the American reader. Here where each state has its own peculiar enactments, even a synopsis of them would be too voluminous for our pages.

Landlord and Tenant.—Lord Kenyon was of opinion that market gardeners and nurserymen may remove the green-houses and hot-houses which they have erected on the land of which they are tenants, even without an agreement; but this is doubtful; they may, however, remove trees, or such as are likely to become so, in the necessary course of their trade. If it were otherwise, the very object of their holding would be defeated. (*Penton v. Robart*, 2 East, 90.) But the outgoing tenant of a garden must not at the end of his term plough up strawberry-beds in full-bearing, which when he entered he bought of a former tenant; although it is the general practice to appraise and pay for these plants as between outgoing and incoming tenants.—For such conduct is malicious, and not in the due course of business. (*Wetherell v. Howell*, 1 Campbell, 227.) So a tenant (not a gardener by trade) must not remove a box edging planted on ground rented by him of another. Neither is he entitled, says Mr. Justice Littledale, (unless by special agreement,) to remove flowers which he had planted. (*Empson v. Soden*, 4 Barn. and Adolph. 655.) And a similar decision has determined that a farmer who raises young fruit trees on the land he hires, for filling up an orchard upon the premises, is not entitled to sell those young trees; but it is otherwise of a nurseryman by trade. (*Wyndham v. Way*, 4 Taunton, 316.)

Even if nurserymen are entitled, without a special agreement, to remove the hot-houses they have erected upon their landlord's land, which is very doubtful, that right does not extend in every instance to other tenants. Thus, a tenant was adjudged not entitled to remove a conservatory erected by himself on a brick foundation, attached to a dwelling-house, and communicating with it by windows and a door, and by a flue passing into the parlour chimney.

(*Buckland v. Butterfield*, 2 Brod. and Bing. 54.) A tenant is liable to pay for the waste if he cuts down any fruit trees in the garden or orchard he holds, but not if they are not growing within the garden or orchard. (Coke's Litt. 53, a.) But he may take away a wooden shed which he had built on brick-work, and posts and rails he had put up. (*Fitzherbert v. Shaw*, 1 H. Blackstone, 259.)

Law Protecting Gardens.—Gardens were not sufficiently protected by law until the year 1828, when the statute 7 & 8 Geo. IV. c. 29 was passed.

Section 38 of this statute enacts that to steal or cut, brake, root up, or otherwise destroy, or damage, with intent to steal, the whole or any part of any tree, sapling, or shrub, or any underwood, above the value of 1*l.* respectively growing in any park, pleasure-ground, garden, orchard or avenue, or in any ground adjoining or belonging to any dwelling-house, or above the value of 5*l.* in any other situation, is felony, and punishable as simple larceny.

By section 39, if the injury to the trees, shrubs, &c., amounts to less than 1*l.*, but to 1*s.* at the least, then summary punishment may be inflicted by a justice of the peace. A fine may be imposed not exceeding 5*l.* above the injury done, upon the first conviction; by imprisonment with hard labour, not exceeding twelve months, upon a second conviction, and, if the conviction take place before two justices of the peace, by public or private whipping; and the third offence, after two previous convictions, is felony, punishable as simple larceny.

By sections 40, 41, and 43, to steal, or to cut, break, or throw down, with intent to steal, any part of any live or dead fence, or any wooden post, pale, or rail, set up or used as a fence, or any stile or gate, or any part thereof; or to have possession of the whole or any part of any sapling or shrub, or any underwood, or any part of any live or dead fence, or any post, pale, rail, stile or gate, or any part thereof respectively, of the value of 2*s.*, without satisfactorily accounting for that possession; and to steal, or destroy, or damage with intent to steal, any cultivated root or plant used for the food of man or beast, or for medicine or distilling, or dyeing, or for or in the course of manufacture,

growing in any land, open or inclosed, not being a garden, orchard, or nursery-ground, is punishable upon summary conviction by fine, imprisonment with or without hard labour, and by public or private whipping, according to the nature of the offence.

So, by section 42, to steal or destroy, or damage with intent to steal, any plant, root, fruit, or vegetable production, growing in any garden, orchard, nursery-ground, hot-house, or conservatory, is, for the first offence, punishable, upon summary conviction, by imprisonment with or without hard labour, not exceeding six months, or by fine, not exceeding 20*l.*; but the second offence is felony, punishable as simple larceny.

Lastly, by section 44, to steal, or rip, cut, or break with intent to steal, any glass or wood-work belonging to any building whatsoever, or any lead, iron, copper, brass, or other metal, or any utensil or fixture, whether made of metal or other material, respectively fixed to any building, or anything made of metal fixed in any land, being private property, or for a fence to any dwelling-house, garden, or area, or in any square, street, or other place dedicated to public use or ornament, is felony, punishable as simple larceny.

Spring Guns and Man Traps.—These were formerly permitted by law to be set in woods, gardens, &c., without any restriction. Injuries the most severe, and even death, were inflicted by them, and the legislature, wisely considering that these punishments were visitations far too excessive for stealing, or intending to steal fruit or game, passed the statute 7 & 8 Geo. IV. c. 18. This enacts that any person who sets or places, or causes to be set or placed, any spring-gun, man-trap, or other engine calculated to destroy human life, or inflict grievous bodily harm, with the intent or whereby the same may destroy or inflict grievous bodily harm upon a trespasser or other person coming in contact therewith, shall be guilty of a misdemeanor and punishable by fine or imprisonment, or both, at the discretion of the court.

The act further provides that persons allowing such guns, traps, or engines already set to continue set, shall be deemed to have set them.

But the Act does not extend to any gin

or trap set to destroy vermin; nor does it forbid the setting of spring-guns, man-traps, &c., in a dwelling-house, from sunset to sunrise. This would justify their being set in any green-house, conservatory, or hot-house, provided it communicated by a door, window or passage with the house in which the proprietor or his servants resided.

Tithes Payable on Gardens.—Gardens and orchards are tithable by common law, and tithes in kind are due not only for all herbs, plants, fruits, and seeds usually grown in them, but for grass or grain grown therein. The insignificance of the herb makes no difference as to its liability, for even parsley is tithable. (*Bunbury*, 10.) Neither does it matter whether the produce be grown for sale or home consumption. (*Williamson v. Lonsdale*, 1 Daniel, 49.) Neither does the plants being raised for pleasure, or as exotic, at a great expense, and not by the natural powers of the soil and climate, make any difference. So all fruits and flowers are tithable, (*Helley*, 100,) and so are pine apples, melons, and other hot-house plants, because as was observed by Chief Baron Skinner, the tithe of gardens is prædial. The notion of artificial heat and soil would exclude almost all the produce of gardens; things raised under glasses are raised in an artificial soil, but must all be subject to the same rule. Inoculation, to be sure, is a work of art, but art and expense used will not make any difference. Baron Eyre added: "Hot-house plants are certainly not exempt. The general rule is clear, and the inconveniences attending it are not great; mutual inconveniences will suggest mutual moderation. (*Adams v. Waller*, Gwillim, 1204.) Bees are tithable for their honey and wax by the tenth measure and the tenth pound. It has been doubted whether the tenth swarm can be demanded, because bees are *fera natura*, but bees in hives may pay tithe by the hive. (3 *Croke*, 404.) Nurseries of trees are tithable if the owner dig them up and sell them. (1 *Coke*, 526, &c.)

Manures Exempt from Toll.—The statute 52 Geo. III. c. 145, works a general exemption, in favour of agriculture, (and horticulture too, for the words of the statute are not restrictive to manures used on farms,) to wagons, carts, &c., loaded with manure, as well

as those going empty.—*Rex. v. Adams*, 6 M. & S. 52.

Also, the statute 3 Geo. IV. c. 126, s. 32, enacts that no toll shall be taken for any horse or other cattle or carriage, employed in carrying or having been employed in carrying on the same day any dung, soil, compost, or manure for improving lands. The word "manure" includes bone-dust, and, it seems, bones before they are crushed. *Pratt v. Brown*, 8 Car. & P. 244. But the statute 4 Geo. IV. c. 95, s. 23, declares that nothing in the 3 Geo. IV. c. 126, shall work any such exemption to manure, &c., if a toll is expressly imposed upon such matters by any local Act or Acts.

Where wagons, &c., laden with manure are exempt from toll, such wagons, &c., in going for it shall be exempted also.—3 Geo. IV. c. 126. s. 26. But in the latter case the driver, upon receiving a ticket, shall pay the toll, to be repaid when he returns with his wagon, &c., laden. Section 28, also, provides that any basket, empty sack, or spade, &c., necessary for loading, if the loading is substantially manure for land, shall not render the wagon &c., liable to toll. So, a wagon returning from London loaded with dung is not liable to be weighed and charged for over-weight, under 13 Geo. III. c. 84, or 14 Geo. III. c. 82, by carrying home two empty bottles and an empty sack, in which the produce of husbandry had been brought from the country the same day.—*Chambers v. Leves*, 2 Camp. 393.

Lime has been adjudged not exempt from toll, although the words of the Act were "anything whatsoever used in the manuring of land," (*Rex v. Gough*, 2 Chit. 655,) nor yet within the exception of the Turnpike Act, 31 Geo. II.—(*Anon.* Lofft. 324.) Lime, however, is sometimes exempted, as by the local Act 3 & 4 Vict. c. 51.

LAWN is a surface of turf in the vicinity of the house, requiring to be kept smooth by the regular application of the roller and scythe. When first constructed, after the ground has been dug over as level as may be, it must be rolled, the hollows filled up, and this repeated until a level surface of earth is obtained. It must then be slightly pointed over with a fork, and the turf laid, or the grass seed sown. See

Turfing. If seed be employed, the following is a good selection, and in the requisite proportions for an acre. The best season for sowing is during moist weather in March.

On 1 acre of new lawn, sow the following grass seeds: *Festuca duriuscula*, $4\frac{1}{2}$ lbs.; *Avena flavescens*, $1\frac{1}{2}$ lb.; *Lolium perenne*, 30 lbs.; *Poa nemoralis*, 3 lbs.; *P. sempervivens*, 2 lbs.; *P. trivialis*, $2\frac{1}{2}$ lbs.; *Trifolium repens*, 11 lbs., and *T. minus*, 3 lbs. This is a sufficient quantity to cover the ground closely in a short time.

In very dry weather all lawns should be watered, and if a little guano and muriate of lime be dissolved in the water it will keep the surface gently moist even in dry weather.

A good kind of grass for improving a lawn, is *Crested Dogstail*; it may be sown in March. Bush-harrow the lawn in order to stir up the soil a little for the seed, which should be sown broadcast when the ground is damp, passing a garden roller over it when the ground becomes sufficiently dry.—*Gard. Chron.*

LAWN RAKE, See article *Turf*.

LAWSONIA. Two species. Stove evergreen trees. Cuttings. Loam, peat, and sand.

LAXMANNIA *gracile*. Greenhouse herbaceous. Division. Loam and peat.

LAYER. The following excellent combination of practice and science is from Dr. Lindley's *Theory of Horticulture*:—

"A layer is a branch bent into the earth, and half cut through at the bend, the free portion of the wound being called 'a tongue.' It is, in fact, a cutting only partially separated from its parent. The object of the gardener is to induce the layer to emit roots into the earth at the tongue. With this view he twists the shoot half round, so as to injure the wood-vessels; he heads it back, so that only a bud or two appears above ground, and when much nicety is requisite, he places a handful of silver sand round the tongued part; then pressing the earth down with his foot, so as to secure the layer, he leaves it without further care. The intention of both tonguing and twisting is to prevent the return of sap from the layer into the main stem, while a small quantity is allowed to rise out of the latter into the former; the effect of this being

to compel the returning sap to organize itself externally as roots, instead of passing downwards below the bark as wood. The bending back is to assist in this object by preventing the expenditure of sap in the formation or rather completion of leaves, and the silver sand is to secure the drainage so necessary to cuttings.

"In most cases, this is sufficient; but it must be obvious, that the exact manner in which the layering is effected is unimportant, and that it may be varied according to circumstances. Thus, Mr. James Munro describes a successful method of layering brittle-branched plants by simply slitting the shoot at the bend, and inserting a stone at that place; (*Gardener's Magazine*, ix. 302;) and Mr. Knight found that, in cases of difficult rooting, the process is facilitated by ringing the shoot just below the tongue about midsummer when the leaves upon the layers had acquired their full growth; (*Hort. Trans.* i. 256;) by which means he prevented the passage of the returning sap further downwards than the point intended for the emission of roots. It will sometimes happen that a branch of a plant cannot be conveniently bent downwards into the earth; in such cases, the earth may be elevated to the branch by various contrivances, as is commonly done by the Chinese. When this is done, no other care is necessary than that required for layers, except to keep the earth surrounding the branch steadily moist." See Fig. 97.

L E A D W O R T.

Plumbago.

LEATHERWOOD.

Dirca.

LEAVES are highly vascular organs, in which are performed some of the most important functions of a plant. They are very general, but not absolutely necessary organs, since the branches sometimes perform their offices. Such plants, however, as naturally possess them, are destroyed or greatly injured by being deprived of them.

The duration of a leaf is in general but for a year, though in some plants

Fig. 97.



they survive for twice or thrice that period. These organs are generally of a green colour. Light seems to have a powerful influence in causing this, since if kept in the dark they become of a pale yellow or even white hue, unless uncombined hydrogen is present, in which case they retain their verdure though light be absent. Hence their etiolation would seem to arise from their being unable to obtain this gas under ordinary circumstances, except when light is present. Now the only source from which they can obtain hydrogen, is by decomposing water; and how light assists in the decomposition, may perhaps be explained by the disoxygenizing power with which it is gifted. The violet rays of the spectrum have this power in the greatest degree; and Sennebler has ascertained by experiment, that those rays have the greatest influence in producing the green colour of plants.

When leaves are of any other hue than green, they are said to be coloured. This variegation is often considered to be a symptom either of tenderness or debility, and it is certain, when the leaves of a plant become generally white that that individual is seldom long-lived. Mr. Knight, however, has demonstrated that variegation is not a certain indication of a deficiency of hardihood.

The function of the leaves appear to be a combination of those of the lungs and stomach of animals; they not only modify the food brought to them from the roots, so as to fit it for increasing the size of the parent plant, but they also absorb nourishment from the atmosphere. The sap, after elaboration in these organs, differs in every plant, though as far as experiments have been tried, it appears to be nearly the same in all vegetables when it first arrives to them. The power of a leaf to generate sap is in proportion to its area of surface, exposure to the light, and congenial situation.

Evergreens transpire less moisture than deciduous plants, which would lead to the expectation that they are more capable of living in dry situations, which in general is really the case. The matter transpired by a healthy plant is nearly pure water, 5,000 grains of it never containing more than one grain of solid matter, and this is consti-

tuted of resinous and gummy matter, with carbonate and sulphate of lime. It appears to be nearly the same in all plants. The quantity varies, however, in every species, probably in every individual, and is greatly influenced by the quantity of water applied to the roots.

The transpiration of plants decreases with that of the temperature to which they are exposed, as well as with the period of their growth. This explains why the gardener finds that his plants do not require so much water in cold weather, nor during the time that elapses between the fall of their blossoms and the ripening of their seed. During this period they do not transpire more than one-half so much as during the period preceding and attending upon their blooming.

The transpiration takes place from the upper surface of the leaves; and if these gradually decay and fall, the growth of the plant ceases until fresh leaves are produced. Hence arises the benefit which plants derive in rooms, greenhouses, and other confined inclosures, from keeping those surfaces cleansed with the sponge and syringe. Some plants are particularly sensitive to injury from any check to their transpiration, among which are the tea-scented roses; and it thence arises that they cannot now be cultivated in nursery-gardens near London, where they once flourished when that metropolis was less extensive.

It must be remembered, however, in using the sponge and syringe, that the under side of leaves is an absorbing surface, benefited by being kept clean, and by the application of moisture. The kidney bean, sunflower, cabbage and spinach, absorb moisture equally by their under and upper surfaces; the cockscomb, purple-leaved amaranth, heliotrope, lilac, and balm, absorb most freely by their upper surfaces; and the vine, pear, cherry, apricot, walnut, mulberry, and rose, absorb most by their under surfaces.

The transpiration from the leaves of plants is effected through pores or stomates, varying in number and size in every species, but being usually either largest or most numerous in plants inhabiting moist or shady localities. This is a wise provision, for such plants, consequently, have an abundant supply of

moist food to their roots, requiring a competent provision for its elaboration and reduction from superfluous water. Those plants which are natives of sandy exposed soils, have, on the other hand, either fewer or smaller stomates.

The drier the air the greater is the amount of moisture transpired; and this becomes so excessive, if it be also promoted by a high temperature, that plants in hot-houses, where it has occurred, often dry up as if burned. The justly lamented Mr. Daniell has well illustrated this, by showing that if the temperature of a hot-house be raised only five degrees, viz., from 75° to 80°, whilst the air within it retains the same degree of moisture, a plant that in the lower temperature exhaled 57 grains of moisture, would in the higher temperature exhale 120 grains in the same space of time. Plants, however, like animals, can bear a higher temperature in dry air than they can in air charged with vapour; animals are scalded in the latter, if the temperature is very elevated, and plants die under similar circumstances as if boiled. MM. Edwards and Collin found kidney beans sustained no injury when the air was dry at a temperature of 167°, but they died in a few minutes if the air was moist.

Other plants under similar circumstances would perish, probably, at a much lower temperature; and the fact affords a warning to the gardener to have the atmosphere in his stoves very dry, whenever he wishes to elevate their temperature for the destruction of insects, or other purposes. Leaves have the power of absorbing moisture as well as of emitting it, which power of absorption they principally enjoy during the night.

During the day leaves also absorb carbonic acid gas, which they decompose, retaining its carbon and emitting the greatest part of the oxygen that enters into its composition. In the night this operation is in a certain measure reversed, a small quantity of oxygen being absorbed from the atmosphere, and a yet smaller proportion of carbonic acid emitted.

Carbonic acid gas in small proportions is essential to the existence of leaves, yet it only benefits them when present in quantities not exceeding one twelfth of the bulk of the atmosphere

in which they are vegetating, though one twenty-fifth is a still more favourable proportion; and as hot-beds, heated by fermenting matters, rapidly have the air within their frames contaminated to a much greater extent than the proportions above named, thence arises the injury to the plants they contain from a too long neglected ventilation. The leaves turn yellow from the excess of acid, which they are unable to digest, and which consequently effects that change of colour which also occurs in autumn, and which will be more fully considered when the decay of plants is detailed.

Whatever promotes an over-luxuriant production of leaf-buds, proportionately diminishes the production of flower-buds, and the reason is obvious. A luxuriant foliage is ever attendant upon an over-abundant supply of moist nourishment to the roots, the consequent amount of sap generated is large, requiring a proportionately increased surface of leaf for its elaboration, and for the transpiration of the superfluous moisture; and as the bud becomes a branch or a root accordingly as circumstances require, so does it produce, as may be necessary for the plant's health, either leaves or flowers.—*Principles of Gardening.*

LEBECKIA. Six species. Green-house evergreen shrubs. Seeds and cuttings. Sandy loam and peat.

LEBRETONIA. *Pavonia.*

LECHENAULTIA. Two species. Green-house evergreen shrubs. Young cuttings. Sandy loam and peat.

LECYTHIS. Six species. Stove evergreen shrubs. Ripe cuttings. Sandy loam.

LEDONGUM. *Cistus ledon.*

LEDUM. Three species. Hardy evergreen shrubs. Layers. Bog earth.

LEE-CHEE. *Euphoria lichi.*

LEEK. *Allium porrum.* The Leek is a hardy biennial, for although it attains perfection in size and for culinary purposes the first year, it does not run to seed until the second, the perfecting of which it also often survives.

The whole plant is eaten, being employed in soups, &c., and is by some persons boiled and eaten with meat.

Varieties.—There are four varieties; the Musselburgh, and the large London Leek, which are by far the best; the

Scotch or Flag, which is larger and hardier; and the Flanders.

Time and Mode of Sowing.—It is raised solely from seed, which may be sown at any time during the spring.

These sowings are performed in general broadcast and raked in, though some gardeners employ drills, the plants to remain after thinning; the Leek, however, is so much benefitted by transplanting as obviously to point out the error of this practice.

Cultivation.—When the plants are three or four inches in height, in eight or ten weeks after sowing, they must be weeded, hoed, and thinned, where growing too close, to two or three inches apart; water also being given, in dry weather, will, with the above treatment, strengthen and forward them for transplanting in another month, or when six or eight inches high. They must be taken away regularly from the seed bed; the ground being well watered previously, if not soft and easily yielding. When thinned out they may be left to remain in the seed bed six inches asunder, as they do not grow so large as the transplanted ones, which must be set by the dibble in rows ten inches apart, and eight in the lines, being inserted nearly down to the leaves, that the neck, by being covered with the earth, may be blanched; water in abundance must be given at the time of planting, and the long weak leaves shortened, but the roots left as uninjured as possible. The bed is hoed over occasionally with advantage, as well to kill the weeds as to loosen the soil. By this treatment, and by cutting off the tops of the leaves about once a month, as new ones are produced, the neck swells to a much larger size. The several sowings above directed will yield a supply from August until the following May, when they advance to seed. A portion should be always taken up and laid in sand previous to the ground being locked up by continued frost, but they will not keep many days in this situation.

LEIANTHUS Nigrescens. Green-house biennial. Seed. Light rich loam.

LEIMANTHIUM. Three species. Hardy herbaceous. Seed. Wet peat soil.

LEMA asparagi. The Asparagus Beetle, by some naturalists called *Cri-*

oceris asparagi is thus described by Mr. Curtis:—

“The larvæ which abound from June to September, not only eat off all the leaves, but even gnaw the rind from the stem of the plants.

“The eggs are oval, and fixed on the plants by one of their ends, one being sometimes attached to the end of another. The larvæ are hatched in a little time; they are short, thick, and fleshy, covered with hairs, wrinkled, ash-coloured, with black head and legs; they move very slowly, and when alarmed emit a blackish fluid from their mouth.

“When full grown, the larvæ go into the ground, where they contract a thick cocoon, in which they assume the pupa state. In a short time the perfect insect appears. It is about a quarter of an inch long, of a blue black colour, with cream coloured or yellow spots on the wing cases, and a red thorax. To lessen the ravages of the insect, little more can be done than to collect them by hand-picking or by shaking them into a net. As many beetles, however, may be found at the time the Asparagus is cut, we recommend that all these should be destroyed before they have an opportunity of depositing their eggs.”—*Gard. Chron.*

LEONOTIS. Four species. *L. intermedia* is a stove evergreen shrub; and two are stove annuals, requiring the usual treatment of tender annuals. Cuttings or seed. Loam and peat. *L. leonurus* is a green-house evergreen shrub, requiring the following treatment:—

“Strike from cuttings in May; keep in a forty-eight pot during the winter; in the beginning of April put into a pot thirteen inches in diameter, and place in a forcing frame kept at a temperature varying from 75° to 50°; here remain for about seven weeks, when remove to the green-house.

“After the end of June, force as much as possible by keeping the house shut up during the day, so as to concentrate all the heat which can be obtained from the sun, but no fire lighted except during cold nights in September and October; 120° is not too great for it, provided it has plenty of water; never suffer the surface of the earth to become dry, and generally keep about an inch of water in the

pan. The quantity required in hot weather, nearly three gallons daily."—*Gard. Chron.*

LEONITOPODIUM *helveticum*. Hardy herbaceous. Seed or division. Peat.

LEONURUS. Eight species, besides varieties. Hardy perennials, biennials, and annuals. Seed. Common soil.

LEOPARD'S BANE. *Doronicum*.

LEPANTHUS. Two species. Stove epiphytes. Offsets. Damp moss under a bell glass.

LEPECHINIA. Two species. Hardy herbaceous. Cuttings. Peat and loam.

LEPIDAGATHIS *cristata*. Stove herbaceous. Cuttings. Sandy rich loam.

LEPIDIUM *sativum*. See *Cress*.

LEPTANDRA. Two species. Hardy herbaceous. Division. Common soil.

LEPTANTHUS *gramineus*. Hardy aquatic. Offsets. Wet peat.

LEPTODERMIS *lanceolata*. Green-house shrub. Cuttings. Loam and peat.

LEPTOMERIA. Two species. Green-house evergreen shrubs. Cuttings. Loam and peat.

LEPTOSIPHON. Five species. Hardy annuals. Seed. Peat. Sow in autumn and in early spring.

LEPTOSPERMUM. Twenty-three species. Green-house evergreen shrubs. Cuttings and seed. Sandy loam and peat.

LEPTOSTELMA *maximum*. Half-hardy herbaceous. Seed and division. Light rich loam.

LEPTOTES *bicolor*. Stove epiphyte. Division. Moss and potsherds.

LESPEDEZA. Twelve species. Chiefly hardy herbaceous, shrubby, and annual plants. *L. cryocarpa* is a green-house evergreen shrub, and *L. glomerata* a stove twiner. Annuals sow in sheltered peat. Shrubs by cuttings, and herbaceous by division. In sandy peat.

LESSERTIA. Nine species. Green-house annuals, herbaceous and shrubby plants. Seed or cuttings. Sandy loam and peat.

LETHRUS *cephalotes*. A beetle preying upon the vine by gnawing off its young shoots. It is common in Hungary, but I do not know that it has been observed in England.

LETTSOMIA *tomentosa*. Stove evergreen shrub. Ripe cuttings. Loam and peat.

LETTUCE. *Lactuca sativa*.

"The LETTUCE is a hardy annual, introduced or cultivated in England since 1562, but from what country is unknown. The use of Lettuce, as a cooling and agreeable salad, is well known; it is also a useful ingredient in soups. It contains, like the other species of this genus, a quantity of opium juice, of a milky nature, from which, of late years, medicine has been prepared, under the title of *Lactucarium*, and which can be administered with effect in cases where opium is inadmissible.

"The varieties are very numerous. Those herein enumerated have been selected from the many which have come under our observation, and will be found to suit the various seasons of the year. Some varieties celebrated in Europe, are of little value here, soon shooting to seed under our hot sun.

"The EARLY CABBAGE LETTUCE is the earliest; it produces a moderately sized and very firm head and is known among the Philadelphia market gardeners as the 'butter salad.'

"The ROYAL CABBAGE LETTUCE is a very large variety, dark green, with firm head, and withstands the sun better than the preceding variety, not rapidly shooting to seed.

"The PALESTINE is a curiously spotted variety, produces a firm head, and of fair size.

"The INDIA is a very fine kind, produces large hard heads, leaves wrinkled, stands the sun remarkably well.

"The PHILADELPHIA CABBAGE resembles the "Royal," and is in all respects a desirable variety.

"The EARLY CURLED does not head; is used principally as "cut salad."

"The Cos, of which there are several varieties, produce conical formed heads, very succulent and crisp; soon run to seed; should therefore be planted early in the spring.

"The BROWN DUTCH somewhat resembles the *early cabbage*, the leaves tinged with brown.

"Lettuce delights in a deep, rich soil, not too heavy or humid. For early spring use sow about the middle of autumn, in some sheltered situation, as the plants, or a portion of them, are to remain there during the winter, lightly covered with straw or cedar brush to protect them from extreme cold. Near the close of autumn a planting may be

made, as directed for "Early York Cabbage," when intended to stand the winter, (which see,) or they may be planted with the cabbage alternately. Early Cabbage, Brown Dutch and Palestine are better suited for planting at this season.

"Part of those which remain in the seed-bed during the winter, should be transplanted as early in the spring as the ground admits of being worked. The remainder may be set out subsequently, which will ensure a more regular supply. To secure an uninterrupted succession, frequent sowings should be made during the early part of summer, thus :—have the ground deeply dug and raked fine ; stretch a line to the extent intended to be planted, along which drop the seed thinly, and rake it in. When the plants are an inch or two in height, thin them to a foot apart, and give frequent hoeings, which will facilitate their growth.

In the earlier sowings those thinned out may be transplanted, and will produce good heads ; but when the weather has become warm and dry they will not succeed well ; it is therefore better to sow over as much ground as will produce the quantity required. For the earlier sowings all varieties will answer ; for the latter ones when the season is advanced and the heat greater, the India and Royal Cabbage are better sorts.

"During the heat of summer the heads will be but poor, unless the season be very cool and humid. Sown about the close of summer and early in autumn, they will do well, as the weather will have become cool before they reach maturity. When sown in autumn for spring heading, it is advisable to take some of the earliest and latest.

"Very good Lettuce may be had in the early part of winter, if planted about the middle of autumn, in frames in a sheltered situation, covering the frames with glass or boards, when the weather becomes cool ; in mild weather, giving plenty of air ; where boards are used removing them to admit light."—*Rural Reg.*

To obtain Seed.—To produce seed some of the finest and most perfect plants of each variety that have survived the winter, or from the forwardest sowing of the year, should be selected. The seed from any that have run up

prematurely, cannot be depended upon. All other plants must be removed from their neighbourhood, themselves being left at least a foot apart ; neither is it allowable for two varieties to flower near each other, or only mongrel varieties will be obtained. Each stem is advantageously attached to a stake as a support in tempestuous weather. It is to be observed, that the branches must be gathered as the seed ripens upon them, and not left until the whole is ready, as some will ripen two or three weeks before others, and consequently, the first and best seed will be shed and lost. It must be particularly well dried before it is beaten out and stored.

Lettuce seed is considered to be best the second year ; but when three years old, it refuses to vegetate.

LETTUCE FLY. See *Anthomyia*.

LEUCADENDRON. Thirty-nine species. Green-house evergreen shrubs. Ripe cuttings. Sandy loam and peat.

LEUCOCORYNE. Three species. Half-hardy bulbs. Seed and offsets. Sandy loam.

LEUCOJUM. Snow-flake. Three species. Hardy bulbs. Offsets. Sandy loam.

LEUCOPOGON. Fifteen species. Green-house evergreen shrubs. Young cuttings. Sandy loam and peat.

LEUCOSPERNUM. Fifteen species. Green-house evergreen shrubs. Ripe cuttings. Sandy turfy loam. They require much watering.

LEUCOSTEMMA *vestitum*. Green-house evergreen shrub. Cuttings. Peat, and sandy loam.

LEUZEA. Five species. Hardy herbaceous. Seed and division. Common soil.

LEWISIA *rediviva*. Hardy herbaceous. Division and seed. Sandy loam and chalk.

LEYCESTRIA *formosa*. Hardy evergreen shrub. Cuttings and seed. Sandy loam.

LEYSSERA. Four species. Green-house evergreen shrubs. Cuttings. Peat and sandy loam.

LIATRIS. Twenty species. Hardy herbaceous. Division. Sandy loam and peat. Take up and give the shelter of a frame during winter.

LIBANOTIS *athamantoides*. Hardy herbaceous. Seed. Calcareous sandy loam.

LIBERTIA *formosa*. Half-hardy herbaceous. Division. Loam and peat.

LICHTENSTEINIA. Two species. Green-house herbaceous. Seed. Sandy loam.

LICUALA. Two species. Stove palms. Seed. Sandy loam.

LIDBECKIA. Two species. Green-house evergreen shrubs. Cuttings. Peat, and a little loam.

LIGATURES, twisted very tightly round the small branches of trees, and the stems of plants, to check the return of their sap, and thus promote their fruitfulness, and the size of the fruit, are much to be preferred to ringing, or other removals of the bark, which cause wounds and canker. Ligatures should be removed as soon as the fruit is ripened.

LIGHT has a powerful influence over the health and life of a plant, from the moment its leaves pierce through the surface of the soil. If absent, they become yellow, or even white, unless uncombined hydrogen be present, in which case they retain their verdure.

Sir H. Davy excluded a cos lettuce from the light. In six days it was rendered very pale, and at the end of another week it was quite white; the growth of the plant was checked, and the analysis of its leaves showed that they contained more carbonic acid and water, but less hydrogen and residual carbon than an equal weight of green leaves.

It deserves notice that it has been proved by the experiments of Dr. Hope and others, that light from artificial sources may be concentrated so as to enable plants to absorb oxygen, and perfect those elaborations on which their green colour depends; and the light of the moon has a similar influence.

A similar concentrated light will make the Pimpernel and other flowers, which close until sunrise, open their petals, and rouse from their rest; a fact, which gives another reason why plants in rooms frequented at night become weak and exhausted sooner than those which then remain, as nature dictates, unexcited by light.

A deficiency of light decreases the decomposing power of the leaves. For this reason the best glass should always be employed in the sashes of the hot-house, conservatory, and other structures of the forcing department. But the benefit sought for is frustrated, if that glass be not constantly well

cleansed. The best glass, if dirty, allows fewer rays of light to pass through than inferior glass if kept bright.

Solar light is essential to the ripening of all fruit; it will not ripen in the dark; and the greater the light's intensity and the longer its daily endurance, the sweeter and the higher is the fruit's flavour. No fruits are so luscious as those grown within the tropics, and the fruits of the temperate zone are excellent in proportion to the brightness of its seasons. That light is essential in causing the colour of the leaves and other parts of plants, has been noticed already; and it aids the ripening process of fruit in a similar manner, to convert their acid and mucilaginous constituents into sugar: much carbon and hydrogen have to be got rid of; and this is effected, if light be admitted, by the evolution of carbonic acid and watery vapour. How light operates in promoting this and other decompositions, which are effected by the vegetable organs, is at present a mystery; but so it is; and the gardener promotes its access as much as lies within his power, by removing overshadowing leaves, by employing the best glass in his hot-houses, and by having their interior whitened; for white surfaces reflect all the rays of light back upon the objects those surfaces inclose.

Almost every flower has a particular degree of light requisite for its full expansion. The blossoms of the pea, and other papilionaceous plants, spread out their wings in fine weather to admit the solar rays, and again close them at the approach of night. Plants requiring powerful stimulants, do not expand their flowers until noon; whilst some would be destroyed if compelled to open in the meridian sun. Of such is the night-blooming cereus, the flowers of which speedily droop, even if exposed to the blaze of light attendant on Indian festivities.—*Princ. of Gardening.*

LIGHTFOOTIA. Three species. Green-house evergreen shrubs. Young cuttings. Loam and peat.

LIGISTRUM. Privet. Three species, and more varieties of *L. vulgare*. Hardy evergreen and deciduous shrubs. Cuttings. Common soil. The evergreen varieties of *L. vulgare* make a good fence. See *Hedges*.

LILACS. *Syringa vulgaris* and *Persica*. Of these very hardy shrubs

there are many varieties; the white, red, and blue-flowered; and of the Persica, also the parsley-leaved and the sage-leaved. They may be raised from suckers, layers, cuttings, and seed; the sowing and planting may be made during the autumn in any common soil.

LILIUM. Lily. Thirty-five species, including the common white lily (*L. candidum*), martagon (*L. martagon*), tiger (*L. tigrinum*), orange (*L. aurantium*), bulb-bearing (*L. bulbiferum*), and their varieties. Besides those already mentioned, the following are especially worthy of cultivation:—

Bronsiartii.

————— *longiflorum.*

Eximium.

Japonicum longiflorum.

Lancifolium album.

————— *punctatum.*

————— *roseum.*

Orange.

Speciosum rubrum.

Superbum pyramidalis.

Venustum.

With the exception of *L. eximium*, which is a green-house bulb, all the others are hardy.

Out-door Culture.—The proper time for planting and transplanting them is in autumn, when their flowers and stalks decay, which is generally in August and September, the roots being then at rest for a short space of time, though the bulbs taken up at the above season of rest, may be kept out of ground if necessary, till October or November; the white lilies, however, do not succeed, if kept long out of the earth; and all the others succeed best when planted again as soon as possible. Plant them four or five inches deep, and at good distances from one another.

None of the sorts require any particular culture, for they will endure all weathers, so no more is necessary than destroying weeds among their stems by the hoe, and supporting with sticks.

They may all remain undisturbed two or three years, or longer; nor, indeed, is it proper to remove these sorts of bulbs oftener, for by remaining, they flower stronger after the first year. It is, however, proper to take up the bulbs entirely every three or four years.

Propagation.—*By Offsets.*—All the sorts of these roots yield offsets abundantly every year, which, when greatly wanted, may be taken off annually, in

autumn; otherwise once in two or three years.

The small offsets should then be planted in beds a foot asunder, and three deep, to remain a year or two; and the large bulbs should be planted again in the borders, &c., singly.

By Seed.—This is sometimes practised, but more particularly for the martagons, to obtain more varieties. In autumn, soon after the seed is ripe, sow it in pots or boxes of rich light earth, half an inch deep; place the pots in a sheltered situation all winter, and the plant will appear in the spring; in April, remove the pots to have only the morning sun all the summer, giving moderate waterings; in August, transplant the bulbs into nursery-beds in flat drills an inch deep, and three or four asunder; but, as the bulbs will be very small, scatter the earth and bulbs together in the drills, and cover them with earth to the above depth; and having grown here till August or September following, transplant into another bed, placing them eight or nine inches each way asunder, here to remain to show their first flowers, then transplant them finally.

—*Abercrombie.*

Pot-Culture.—The following excellent directions, though applicable especially to *L. speciosum* or *lancifolium*, are also applicable to others of this genus. They are the practical directions of Mr. Groom, the well-known florist, of Walworth, near London. He says:—

“To cultivate *Lilia* in the greatest perfection, they should be removed as rarely as possible, and only when the bulbs become too close; for disturbing them is most injurious to their growth and flowering.”

Bulbs from Stems.—To obtain these from *L. speciosum*, and the practice would, perhaps, succeed with several others, Mr. Groom placed pieces of turfy peat round the stem, with room for finer peat to be placed next the plant; in this bulbs were very successfully obtained.

Potting.—“Grow them in pots of large size, having plenty of drainage, and use peat only, with a little fine sand for the soil. One great point is to keep the bulbs, particularly the largest, at a sufficient depth, to allow room for the stem-fibres to grow freely. When they require repotting, which should only be performed whilst the bulbs are dormant,

they should be turned out of the old pots, and the crocks should be carefully removed, so as to avoid injuring the fibres, or even shaking off the earth; the bulbs are then to be repotted in a larger-sized pot, in peat and sand, with good drainage.

Raising Varieties.—Mr. Groom observes, that “in hybridizing, care should be always taken to save seed from those flowers which have the best shape; for I believe the form of the future flower is much more dependent on the kind from which the seed is saved than upon that which furnishes the pollen; the pollen generally gives the colour. It is also highly desirable that the flower from which the pollen is taken should be darker than that producing the seed; for I have found in such cases the seedlings have been much more beautiful (being frequently spotted or striped), than where I have reversed the process. I have seen this occur in so marked a manner in the ranunculus, that I have adopted it as a principle, never to take pollen from a lighter coloured flower.”
—*Gard. Chron.*

LILY. *Lilium*.

LILY-HYACINTH. *Scilla Lilia-hyacinthus*.

LILY-OF-THE-VALLEY. *Convallaria majalis*.

Soil and Situation.—Clayey loam, near water, and where the noonday sun is intercepted by shade, suits it best.

Propagation.—Mr. D. Watts communicated a paper to the Regent's Park Gardeners' Society, in 1845, from which the following are extracts:—“Before planting, dig over and well break the ground about nine inches deep, then plant the roots about four inches apart, all over the surface of the ground, giving them a gentle press down with the thumb and finger, and then cover them about four inches thick with the same sort of soil. On forming new plantations of this plant, I select all the flowering buds from my stock of roots, which I plant by themselves, but in the same way as I do the others. If equal quantities of each can be had, there will be equal quantities of flowers for two or three successive seasons, after which they should be all taken up, the roots divided, and replanted in the same way. At the time of replanting, it will be requisite to leave a sufficient quantity

undisturbed, for the purpose of lifting, for forcing during the winter months.

Forcing.—Pot them in thirty-two-sized pots, filled to within three and a half inches of the rim with rich loam, upon which the roots are closely placed, and then covered about two inches in thickness with equal parts of leaf mould and sand; they are then well watered, so as to settle the mould about the roots; place them on a shelf near the glass, in a moist stove, or forcing-house, the temperature of which may range from 65° to 75°, and take care that the soil does not become dry. When they are so far advanced that the plants show their heads of flowers, remove them into a warm green-house, still placing them near the glass, until as they advance in growth they are withdrawn by degrees into a shaded part of the house, from whence they are removed to the drawing room as required, their places to be immediately filled with others, which are similarly treated, and thus an ample succession will be kept up. Care and attention are requisite in lifting and selecting the plants for forcing; they require a minute examination to distinguish those that will flower from those that will not, the only difference being that the buds of the former are more round and short than those of the latter.”—*Florist's Journ.*

LILY-PINK. *Aphyllanthes*.

LILY-THORN. *Catesbea*.

LIME. *Citrus limonum*.

LIME is valuable as a manure, for some one or more of its salts enter into the composition of every vegetable. But it is not the lime of every district that is suitable for the purpose. Some specimens contain a very large proportion of magnesia, which, absorbing carbonic acid very slowly, remains in a caustic state, to the injury of the roots of the plants, and the diminution of benefit from the carbonic acid evolved by the decomposing constituents of the soil. Neither can the gardener apply it to all his soils with advantage. Thus, peat and bog earth are beneficial to the plants grown upon them by their containing gallic and other acids which lime removes.

To garden soil of the usual staple about fifty bushels of lime per acre is a sufficient quantity. If the soil be clayey the quantity may be doubled. A very excellent manure is formed by mixing

one bushel of salt with every two bushels of lime.

Lime cannot be applied to the soil too fresh from the kiln; for if allowed to absorb carbonic acid from the air, it is rapidly converted into chalk.

"It is astonishing how ignorantly neglectful are the cultivators of the soil, when their crops are devastated by the slug, not to dress them so as to render the surface of the soil quite white, during the promise of a few days' dry weather, with caustic lime. It is instant destruction to every slug it falls upon; and those that it misses are destroyed by their coming in contact with it when moving in search of food.

"It is a common practice to burn couch-grass, docks, gorse, and other vegetables, which are very retentive of life, or slow in decay; a more uneconomical, unscientific method of reducing to a state beneficial to the land of which they were the refuse, cannot be devised. In breaking up heaths, such exuvæ are very abundant; but, in all cases, if the weeds, leaves, &c., were conveyed to a hole or pit, and, with every single horse-load, and with barrow-loads in proportion, a bushel of salt and a half bushel of lime were incorporated, it would in a few months form a mass of decayed compost of the most fertilizing quality; the lime retaining many of the gases evolved during the putrefaction of the vegetable matter, and the salt combining with the lime to destroy noxious animals, which might form a *nidus* in the mass. By this plan nearly all the carbonaceous matters of the refuse vegetables are retained; by burning, nearly all of them are dissipated."—*Principles of Gardening*.

Lime rubbish is the old mortar and plaster obtained when brick buildings are pulled down. It is an excellent manure, abounding with the salts of potash and lime. It should be reduced to powder before spreading and digging in.

LIME, or LINDEN-TREE. *Tilia*.

LIME-WATER. "As water can hold only a certain quantity of lime in solution, it is immaterial how much of that substance you mix with it. The mixture should be well stirred, and should be left until it has become clear, when it will be fit for use. The best

mode of proceeding is to take forty gallons of clean water, and, half an hour before using, put one peck of fresh-slacked lime into it. As soon as it is clear it is fit for use.

"A watering-pot containing four gallons will water a bed of four feet by thirty feet, or rows of cauliflowers, cabbages, &c., of double the length."—*Gard. Chron.*

LIMNANTHES *Douglasii*. Hardy annual trailer. Seed. Sandy loam and shady situation.

LIMNOCHARIS. Two species. Stove perennial aquatics. Seed and runners. Water.

LIMONIA. Five species. Green-house evergreen shrubs, except *L. scandens*, which is a climber. Cuttings. Rich light loam and peat.

LINANTHUS *dichotomus*. Hardy annual. Seed. Common soil.

LINARIA. Seventy-five species. Hardy annual trailers, and herbaceous and evergreen shrubs, except *L. fruticans*, and *L. scoparia*, which are green-house evergreen shrubs. Seed or cuttings. Sandy loam.

LINCONIA. Three species. Green-house evergreen shrubs. Young cuttings. Sandy peat.

LINDERNIA *pyxidaria*. Hardy annual. Seed. Common soil.

LINDLEYA *mespiloides*. Half-hardy evergreen shrub. Cuttings, and grafts on the common thorn and larger cotoneasters. Sandy loam, mixed with calcareous rubbish.

LINDSÆA. Five species. Stove and green-house ferns. Division and seed. Sandy loam and peat.

LINNÆA *borealis*. Hardy evergreen trailer. Division. Shaded peat soil.

LINUM. Fifty-one species. Chiefly hardy herbaceous and annuals; a few green-house evergreen shrubs. Seed, division, and cuttings. Sandy loam and a little peat.

LION'S-EAR. *Leonotis*.

LION'S-FOOT. *Leontopodium*.

LION'S-TAIL. *Leonotis leonurus*.

LIPARIA *spharica*. Green-house evergreen shrub. Young cuttings. Sandy loam and peat. Not too much water.

LIPARIS. Fifteen species. Stove epiphytes and orchids. All propagated by offsets. Epiphytes in peat and potsherds; terrestrial orchids in sandy peat and sandy loam.

LIPOSTOMA *campanuliflora*. Stove evergreen tree. Cuttings. Loam and peat.

LIPPIA. Two species. Stove. *L. dulcis*, herbaceous; *L. purpurea*, evergreen shrub. Cuttings. Rich light soil.

LIQUIDAMBAR. Two species. Hardy deciduous trees. Seed and cuttings. Common soil.

LIQUID-MANURE is the most advantageous form in which fertilizers can be applied by the gardener to his crops. It is the most economical, most prompt, and most efficient mode. The manure is presented to the roots in one of the only forms in which the roots can imbibe food, and the manure is spread regularly through the texture of the soil. If, instead of digging in stable-manure, each crop was watered occasionally with liquid-manure, the produce would be finer and more abundant.

My brother, Mr. Cuthbert Johnson, says, in his excellent work on "*Fertilizers*:"—

"I have often employed with decided effect, in my own garden, for vines, peach, and standard apple-trees, liquid-manure, prepared either by mixing one part by weight of cow-dung with four parts of water, or the collected drainage of the stable and cow-house. It has been found advantageous to plants cultivated in stoves to apply even a liquid-manure, composed of six quarts of soot to a hogshead of water; and although this is a very unchemical mixture, yet it has been found by Mr. Robertson to be peculiarly grateful and nourishing to pines, causing them to assume an unusually deep healthy green; and, for stoved mulberry, vine, peach, and other plants, the late Mr. Knight, of Downton, employed a liquid-manure, composed of one part of the dung of domestic poultry and four to ten parts of water, with the most excellent result."—*Johnson on Fertilizers*.

Guano Liquid Manure.—Ten gallons of water will readily dissolve, or keep suspended in a state of minute division, about 50 lbs. weight of guano. When applied to plants, not more than five ounces should be added to that quantity of water. If it be made stronger, it injures or kills the plants to which it is applied.

Sheep's-dung, if employed for making

liquid manure, should be a peck to thirty gallons.

When *cow-dung* is used, boiling water should be first poured upon it, as it is apt to be full of destructive larvæ.

Sulphate of Ammonia, and any other salt of ammonia, must not be used more than a quarter of an ounce to each gallon.

LIQUORICE. *Glycyrrhiza glabra*, is only admitted into the garden for its pharmaceutical properties.

Soil and Situation.—It thrives best in a rich light soil, two or three feet deep, which should be trenched completely to the bottom before planting. When manure is added, it should be regularly mixed throughout the texture of the soil. In shallow or poor ground it will not succeed: the situation cannot be too open.

Time and Mode of Planting.—It is propagated by cuttings of the side-roots, which spring from the crown of the plants, and run horizontally just beneath the surface, which may be planted in January, February, or early in March. Each set should be about two inches beneath the surface. The only cultivation they require is to be frequently hoed, to keep them clear of weeds throughout their growth; and in autumn the decayed stalks to be cut down, and the earth stirred between the rows.

The roots are not fit for use until of three or four years' growth. The season for taking them up is December, January, or February. A trench must be dug regularly along each row, quite down to the extremity of the principal roots, which descend two feet and more.

LIRIODENDRON *tulipifera*, and one variety *L. T. obtusifolia*. Hardy deciduous tree. Seed. Rich light loam.

LISIANTHUS. Eight species. Stove plants, evergreen, herbaceous, and annual. Seed or cuttings. Sandy loam and peat.

L. Russellianus is a half-hardy biennial. Mr. Cuthill, of Denmark Hill, near London, is its most successful cultivator; and the directions given by him, with some other suggestions, are as follow:—

Sow the first week of March in a forty-eight pot. Fill the pot very firmly with a compost of loam, and leaf-mould or peat, in equal proportions, mixed with a little sand; over the compost

put half an inch in depth of damp sand, and on this, being first pressed flat, the seed is to be sown, and covered with a little dry river-sand. Cover the top of the pot with a piece of glass, and keep in a temperature of 70°. Never water on the top, but keep in a pan constantly supplied with water. When the seedlings are three weeks old, prick out singly into sixties: the compost as before, with plenty of drainage. When established give water abundantly, both in the pans and over the foliage, and keep in a temperature of about 80°. In August top them at every joint, and six weeks after shift into forty-eights. Give water now only in pans—for the surface of the earth must be kept dry—once a fortnight in dry weather, else once a month; and retain the plants through the winter in a temperature between 50° and 60°. As February closes remove them to a temperature of about 75°, moving them, as soon as vegetation is renewed, into eights. They now require a high temperature, about 80° or 85°, abundance of water, and some liquid-manure. If kept in a pit during the winter, they must not at first, when moved into a house, be exposed to the sun's rays. They will bloom in July, and continue in flower two or three months, if supplied abundantly with water or liquid manure. Dryness of soil occasions a speedy fall of the blossoms.—*Johnson's Gardener's Almanack.*

LISANTHE. Seven species. Green-house evergreen shrubs. Young cuttings in spring. Sandy peat. Repot into larger pots before moving from green-house in summer.

LISSOCHILUS roseus. Stove epiphyte. Offsets. Peat and potsherds.

LISTS, for fastening trees against walls, are usually merely shreds of woollen cloth cut into lengths varying from two to four inches. Strips of very thin sheet-lead are preferable as not harbouring insects; and, if there be any truth in electricity being beneficial to growing plants, lead thus employed should improve their growth; for, with the nails, it forms a gentle galvanic battery. Wires and twine have been recommended to tie the branches to the walls; but the process is tedious, and cuts are inflicted, inducing gum and canker. Shreds of a black, blue, or red colour look best, harmonizing with that of the leaves. If old lists are re-em-

ployed they should be previously boiled to destroy the larvæ of insects.

LITHOSPERMUM. Fifteen species. Chiefly hardy, herbaceous, and evergreen perennials. *L. dispersum* and *L. tenuiflorum* are annuals. *L. distichum* and *L. scabrum* are green-house herbaceous. Seed or cuttings. Light calcareous soil.

LITTÆA geminiflora. Green-house evergreen perennial. Suckers. Sandy loam.

LIVISTONIA. Two species. Stove palms. Seed. Sandy loam.

LOAM is a very indefinite term: almost every cultivator of the soil associates with it a different explanation. In some parts of England clay is so called, and in others it is employed to designate brick-earth! As usually employed, it really is only synonymous with the word soil; for it has to be qualified by the terms turfy, sandy, clayey, and chalky, just as turf, sand, clay, or chalk predominate. Then, what is *hazel loam*? Why, no other than a rich friable soil, having a dark brown or hazel colour, owing to the predominance of decaying vegetable matters. Before long, we hope to see determined how much silica is to be understood as existing in a loam termed *sandy*, and how much alumina in that which is correctly termed *clayey*.

The following is the analysis of a hazel loam:—

Silica and quartz sand . . .	95.0
Alumina	3.0
Vegetable matters . . .	5.0
Oxide of iron	1.5
Lime, soda, oxide of manganese	0.25
Gypsum, phosphate of lime, } and common salt . . . }	0.25

Such a loam is useful to render light soils more retentive, and heavy soils more porous; but, for this purpose, must be applied at the rate of 100 tons per acre.

Maiden loam is soil taken from the surface of a pasture.

LOASA. Nine species. Chiefly hardy and green-house annuals. *L. incana* is a green-house evergreen trailer. Seed. Light soil. *L. placei* is a dangerous stinging plant. Mr. Halliday, gardener at Elmham Hall, gives these directions for cultivating:—

“*L. lateritia.*—Plants of this, saved from seeds sown in the spring, kept in pots during the summer, shifted twice

or oftener in the course of the autumn, so as to require a twenty-four sized pot about March, make good green-house plants for the same season. Planted out at the same time as other half-hardies, in a shaded situation, it also makes a good bed for the flower-garden, putting a stiff, branchy pea-stake to each plant for it to run upon. But it best unfolds its beauty upon a north wall, planted out in a rich, light soil, with four or more pieces of line to each plant for the shoots to climb."—*Gard. Chron.*

LOAVING. See *Heading*.

LOBELIA. Eighty-four species. Chiefly hardy and green-house herbaceous plants. Some, however, are annual, and others require the heat of a stove. Herbaceous are propagated by division; shrubby by cuttings; annuals by seed. Sandy loam and peat suit them all.

LOBSTER-SHELLS. See *Animal Matters*.

LOCUST-TREE. *Hymenæa*.

LODIGESIA *oxalidifolia*. Green-house evergreen shrub. Cuttings. Sandy loam and peat.

LOMATIA. Five species. Green-house evergreen shrubs. Cuttings. Sand and peat.

LONCHITES. Two species. Stove ferns. Division. Turfy loam and peat.

LONGHOCARPUS. Nine species. Stove evergreen trees. Young cuttings. Loam and peat.

LONGCHAMPSIA *capillifolia*. Hardy annual. Seed. Common soil.

LONDON-PRIDE. *Saxifraga umbrosa*.

LONICERA. Honeysuckle. Eighteen species. Hardy deciduous shrubs and twiners. Cuttings in autumn. Common soil.

LOOKING-GLASS TREE. *Heritiera*.

LOOSESTRIFE. *Lysimachia*.

LOPEZIA. Six species. Hardy annuals and green-house biennials. All require to be raised in a hot-bed; the annuals to be removed to a south border, and the others to the green-house.

LOPHANTHUS. Five species. Hardy herbaceous perennials. Division and cuttings. Common soil.

LOPHIOLA *aurea*. Hardy herbaceous. Division. Damp peat soil.

LOPHIRA *africana*. Stove ever-

green tree. Cuttings. Sandy loam and peat. Little water.

LOPHOSPERMUM. Three species. Half-hardy evergreen climbers. Cuttings. Rich light loam.

LOPIMIA *malacophylla*. Stove evergreen shrub. Young cuttings. Rich light soil.

LOQUAT. *Eriobotrya japonica*. The following are the best directions we have for its cultivation:—

"Light sandy loam, which is naturally rich, suits the loquat well. Young plants may be purchased of the London nurserymen; but they should be rejected if they have not been grafted on the common *mespilus germanica*, or some other nearly allied genius."

"They may be propagated by seeds or layers; but if so raised, they must be afterwards grafted. They may be planted six or eight feet apart in the house; but when they become too crowded every alternate plant should be removed on small hillocks of earth corresponding with the size of the plants, which, as they advance in growth, may, from time to time, have fresh earth added to their roots until the border is filled level. Care must be taken, whilst the plants are young, to make them produce the requisite quantity of branches close to the graft, by shortening the shoots, or by pinching off the tips.

"The loquat is half-hardy; and it will therefore be necessary to keep a little fire in the house in winter, to prevent the frost from injuring the plants. The trees bloom naturally at that season; but in this respect are almost at the command of the gardener. They may be forced into bloom in autumn; or, by keeping the house very cool in winter, their blooming may be retarded until spring.

"The temperature, during the growing seasons, may correspond with that which is given to the peach when forced.

"When the fruit is gathered, more air should be admitted into the house. In autumn the sashes might be entirely removed, for a short time, so long as there is no danger of frost.

"Though a separate house is highly desirable to cultivate the loquat in, it by no means follows that it will not grow and fruit elsewhere. If it can be accommodated with the back-wall of a

pine or plant-stove, with a border of two or three feet in breadth to grow in, it will succeed remarkably well. It is far from being a tender tree, or one difficult to manage, being of a robust, healthy habit, and requiring but little attention.

"Some people eat the fruit before it is quite ripe, at which period it has an agreeable acid flavour; but to obtain a luscious, melting, highly-flavoured fruit, it should hang on the trees until somewhat shrivelled. It is probable that the fruit would ripen on the back-wall of some green-house, if it had plenty of light and air; at all events it is worth a trial."—*Gard. Chron.*

LORD ANSON'S PEA. *Lathyrus magellanicus*.

LOTE. *Zizyphus lotus*.

LOTUS. Forty species. Mostly hardy and half-hardy annual and perennial trailers. Perennials are increased by cuttings; and the annuals by seed, in any light soil.

LOUREA. Two species. Stove biennials. Seed. Light rich loam.

LOUSEWORT. *Pedicularis*.

LOUSE. See *Aphis*.

LOVE-APPLE. *Lycopersicon esculentum*. See *Tomato*.

LOVE-LIES-BLEEDING. *Amaranthus caudatus*.

LOWEA *berberifolia*. Half-hardy deciduous shrub. Seed and layers; sandy loam and peat. Common salt applied occasionally is beneficial.

LOZOTÆNIA *rosaria*, is a small moth, of which the caterpillar feeds upon the leaves of the rose tree. Mr. Curtis says, that—"The eggs are laid in the summer or autumn, and hatch with the opening leaves; and the little caterpillar begins at once to form a residence by drawing two or more leaflets together, on which it feeds. This operation soon points out where the caterpillar is, and the best method which we know of getting rid of it, is hand-picking, which should be practised as soon as the operation of the caterpillar becomes visible."—*Gard. Chron.*

LUCULIA *gratissima*. Green-house evergreen shrub.

Propagation by Cuttings.—"In propagating this take a piece of light peat and break it quite fine, add about one-third of fine silver sand, mix this well together, and taking some small thumb pots, place one crock at the bottom of

each pot, and fill them with the above compost, about three parts full, press this down in the centre of the pot, and fill the remainder of the pot with silver sand; give them a good watering to settle the cuttings, then take a large pot and fill it half full of draining, and the remainder with sand or gravel, and then plunge four of the little pots in this large one, and place a bell-glass over them. Plunge in bottom-heat, and in about a month the cuttings are rooted and fit for potting off into small sixty-pots; keep them close for about a week or so."

Grafting.—Mr. Beaton grafts the *Luculia* upon stocks of *Burchellia capensis*.—*Gard. Chron.*

After-Culture.—"Drainage is absolutely indispensable for *Luculia*. During the summer and early autumnal months water should be freely supplied, and the under surface of the leaves, as well as the whole plant, repeatedly washed with the fine rose of the syringe. The general waterings must also be gradually diminished in September, and afterwards administered very sparingly, for the fine fibrous roots are easily injured by too much moisture. It requires a much cooler treatment than it generally receives, and should never be grown in a pot when it can be planted out in a conservatory."—*Gard. Chron.*

"It is not inclined to grow naturally, and therefore should not be stimulated in the spring and early summer. During that period it should be kept in a green-house: towards the end of May and the beginning of June, it should be planted out in a warm place rather sheltered from the sun. In August or September it should be taken up and repotted, and placed in a vinery or cool hot-house. It will then grow vigorously, and form its head of blossoms, which are both beautiful and fragrant, and expand during the greater part of the winter. It may be kept in the drawing room without injury till it has done flowering, and should then be returned to the green-house."—*Gard. Chron.*

LUCUMA. Four species. Stove evergreen trees. Ripe cuttings. Rich sandy loam.

LUHEA *paniculata*. Stove evergreen climber. Cuttings. Peat and loam.

LUISIA *alpina*. Stove epiphyte.

Lateral shoots, six inches long; attached to blocks of charred wood.

LUMNITZERA *moschata*, a greenhouse annual; and *L. tenuiflora*, a stove herbaceous perennial. The first by seed, the second by division. Common soil.

LUNARIA. Honesty. Two species. Hardy biennial and perennial. Seed. Common shaded soil.

LUNGWORT. *Pulmonaria*.

LUPINUS. Lupine. Fifty-seven species. Chiefly hardy annual and herbaceous plants. Of these the propagation is effected by seed in the open ground in March, April, and May, observing that as too copious moisture is apt to rot the seed, they should not be sowed earlier than the middle or latter end of March, except on very dry, warm soils.

The annual sorts should be sowed at once in the places where the plants are to flower, for they do not succeed by transplantation, and to have a succession of bloom, about three or four different sowings may be necessary from about the middle or latter end of March until June, especially the yellow sort, whose bloom is rather of short duration; observing to sow all the sorts in patches, four, five, or six seeds in each, near an inch deep, and when the plants come up, leave only three of the best of them, though of the large kind one or two may be sufficient in each place. When large quantities are required for nosegays to supply the markets, &c., as practised about London with the yellow sweet scented sort, they may be sowed in rows in beds, drilling them in an inch deep, allowing a foot between the rows. Keep them clean from weeds, which is all the culture they require: the first sown plants will furnish plenty of ripe seed. If some seeds are sowed in autumn, in September, in a warm dry situation, the plants will come up, and often stand the winter tolerably well, and flower early the following year; or, if some are sowed in pots, especially the giant sort, comprising the Large Blue, and the Rose Lupine, which in wet autumns ripen seed but indifferently, so that by placing the pots in a garden frame, to have occasional protection from hard frost, they will flower early in the following summer, so as to perfect seeds before they are attacked by the autumnal rains.

The perennial sort may be sowed

either in patches in the different compartments as already observed, for the plants to remain where sowed; or may be sowed in beds in drills for transplantation; but as the plants generally send their roots deep into the ground, they generally succeed best when permitted to remain where raised.—*Abercrombie*.

LUXEMBURGIA *ciliosa*. Stove evergreen shrub. Cuttings. Light rich loam.

LYCASTE. Four species. Stove epiphyte. Offsets. Peat and potsherds.

LYCHNIS. Twenty species. Hardy herbaceous, except *L. calirosa* and *L. githago*, which are annuals. Seed or divisions, the latter to be annually repeated. Light rich loam.

LYCIUM. Sixteen species. Hardy and half-hardy deciduous and evergreen shrubs and climbers. Cuttings. Light loam.

LYCOPERSICON. Nine species. Hardy annuals, except *L. peruvianum*, which is a stove herbaceous perennial. See *Love-Apple*.

LYON, John. Mr. Lyon was born in Scotland, and emigrated to this country about the commencement of the present century. He shortly thereafter entered into the employ of the late Wm. Hamilton, and, for several years, superintended his choice collection of exotic plants at the "Woodlands." Mr. Lyon subsequently became a regular collector of American plants and seeds for exportation, and in the prosecution of his object made frequent excursions to the south and west. His collections were usually congregated at the Nursery grounds of his friends at Philadelphia, and, when properly prepared, were by him taken to Europe. He made a number of trips to England, each time carrying with him large lots of our native plants, which met with ready sale at liberal prices. Thirty or forty years ago the communication with Europe was not so trifling a matter as at present, and a journey of some thousand miles in search of floral treasures, and their transportation across the Atlantic, was quite an event in the horticultural world. Mr. Lyon was a man of cultivated mind, and, to a good plain education, such as most of his countrymen receive, he had added the results of extensive reading and observation.

He died about the year 1816, whilst on a collecting journey in Tennessee, from fever contracted by exposure whilst travelling on horseback.

LYONIA. Six species. Hardy evergreen shrubs. Layers and seed. Peat.

LYONSIA straminea. Stove evergreen twiner. Cuttings. Loam and peat.

LYSIMACHIA. Twenty species. Hardy herbaceous perennials and annuals, except *L. atropurpurea* and *L. maculata*, which require a green-house. *L. thyrsiflora* is an aquatic. Annuals by seed; others by division. Common soil.

LYSINEMA. Five species. Green-house evergreen shrubs. Cuttings. Sandy peat.

LYTHRUM. Eleven species. Hardy herbaceous and annuals. Division or seed. Common soil.

MABA buzifolia, a stove evergreen shrub, and *M. laurina*, a green-house evergreen trailer. Ripe cuttings. Loam and peat.

MACLEANIA longiflora. Green-house evergreen shrub. Cuttings. Light loam.

MACLEAYA cordata. Hardy herbaceous perennial. Division, and seeds. Rich mould.

MACLURA. Three species. *M. aurantiaca* is a hardy deciduous tree; the two others, stove evergreen trees. Ripe cuttings. Turfy loam and peat. *M. aurantiaca*, the Osage Orange, is admirably adapted for hedges: it is of rapid growth, perfectly hardy as far north as Pennsylvania, is not subject to disease, is armed with sharp spines which pain on puncture, and, abounding in acrid juice, is not browsed by cattle. With these qualities it is, we think, destined to be extensively used as a hedge plant.

M'MAHON, Bernard, was a native of Ireland. Implicated in the disastrous rebellion of '98, he fled to this country, and was for some years connected with a political newspaper of Philadelphia. Our purpose is, however, to refer to Mr. M'Mahon as associated with the subject of this work. Mr. M. ultimately established himself as a Nursery and Seedsman in that city, and published an excellent book on gardening, the "American Gardener's Calendar," which was favourably received, and opportunely issued, for at that time information on

the art, of which it treated, was in the United States much needed. He was said to have been a man of liberal education, and an ardent admirer of horticulture. It is probable his love for it led to his embarking in the sale of plants and seeds as a profession. In connection with his seed-store, Mr. M. established a Nursery near the city, and concentrated many interesting specimens on his grounds. They were, at a later day, under the management of his son, but are now, we believe, no longer cultivated as a Nursery.

MACRADENIA. Three species. Stove orchids. Division. Wood.

MACROCNEUM. Two species. Stove evergreen trees. Cuttings. Loam and peat.

MACROPODIUM laciniatum. A hardy annual, increased by seeds; and *M. nivale*, a hardy herbaceous perennial, increased by cuttings. A light rich soil suits them both.

MACROTYS racemosa. Hardy herbaceous perennial. Division. Rich soil.

MADAGASCAR NUTMEG. *Agathophyllum.*

MADAGASCAR POTATO. *Solanum anguivi.*

MAD-APPLE. *Solanum insanum.*

MADDER. *Rubia.*

MADIA. Two species. Hardy annuals. Seeds. Common soil.

MADWORT. *Alyssum.*

MÆSA. Five species. Stove evergreen shrubs or trees. Cuttings. Peat and loam.

MAGNOLIA. Fourteen species. They are chiefly hardy deciduous trees, but *M. grandiflora*, and its varieties, require protection in Pennsylvania, in severe winters, especially if the soil be not thoroughly drained. The next most worthy of cultivation are *M. acuminata*, *M. macrophylla*, *M. glauca*, and *M. purpurea*.

Planting.—The best season for planting all the species is early in spring, though as those sorts which are in pots may be turned out with the ball of earth about their roots, they may be occasionally transplanted in October or beginning of November. Observe, as they are rather of a tender nature in their younger growth, it is proper to allot them a sheltered sunny situation, and dry soil; and all of them should be stationed in the most conspicuous point

of view, and not too closely crowded with shrubs of inferior merit.

MAGPIE MOTH. See *Abraxas*.

MAHERNIA. Thirteen species. Green-house evergreen shrubs. Young cuttings taken off at a joint. Loam and sandy peat.

MAHONIA. Four species. Hardy or half-hardy evergreen shrubs. *M. nervosa* is deciduous. Layers or ripe cuttings. Sand, peat, and loam.

MAIDEN HAIR. *Passiflora adiantum*, and *Adiantum capillus veneris*, &c.

MAIDEN-HAIR TREE. *Salisburia adiantifolia*.

MAIDEN TREE is a seedling tree which has not been grafted.

The time which elapses before seedlings attain a bearing age is very various. The pear requires from twelve to eighteen years; the apple five to thirteen; plum and cherry four to five; vine three to four; raspberry two; and the strawberry one.

MAJORANA. Four species. Half-hardy evergreen shrubs. *M. hortensis* a hardy annual. Slips or cuttings. They succeed well in a sandy soil and a dry situation.

MALABAR LEAF. *Cinnamomum Malabatrum*.

MALABAR NIGHTSHADE. *Bassella*.

MALABAR NUT. *Justicia adhatoda*.

MALABAR ROSE. *Hibiscus Rosa Malabarica*.

MALACHODENDRON *ovalum*. Hardy deciduous tree. Layers or ripe cuttings. Peat and loam.

MALAY APPLE. *Jambosa malacensis*.

MALASIS paludosa. Hardy orchid. Division. Sandy peat.

MALESHERBIA. Two species. Green-house annuals. Seeds. Sandy loam.

MALFORMATION. See *Deformity*.

MALLOW. *Malva*.

MALOPE. Two species. Hardy annuals. Seeds. Common soil.

MALPIGHIA. Fourteen species. Stove evergreen shrubs or trees. Ripe cuttings. Light soil.

MALT DUST. See *Vegetable Manures*.

MALVA. Mallow. Forty-eight species. The stove and green-house evergreen shrubs increase by cuttings, and

grow well in any rich soil. The hardy and half-hardy herbaceous kinds increase by division or by seeds. The hardy annuals by seeds, and common soil.

MALVAVISCUS. Three species. Stove evergreen shrubs. Cuttings. Loam and peat.

MAMMEA americana. Stove evergreen fruit tree. Ripe cuttings. Sandy loam.

MAMESTRA. *M. brassicae*, *M. oleacea*. The whole cabbage tribe are subject to the attacks of the caterpillars of these moths, known as the *Cabbage* and *White-line Brown-eyed* Moths. These appear in June or May. The Cabbage Moth is light brown, with wavy marked wings; its caterpillar is green stained with grey, with a dark line down the back. The White-line Moth is rusty brown, and its upper wings white margined, with an orange coloured spot near it; caterpillar brownish. Hand-picking or lime dust are the only remedies.—*Curtis*.

MAMMILLARIA. Seventy-eight species. Stove evergreen shrubs. Offsets. Sandy peat.

MANDARIN ORANGE. *Citrus nobilis*.

MANETTIA. Four species. Stove evergreen climbers. Young cuttings. Loam and peat.

MANGIFERA. Mango Tree. Two species. Stove evergreen tropical fruit trees. Ripe cuttings, or fresh seeds imported from the places of their natural growth. Turfy sandy loam, or loam and peat. The mango thrives best in a temperature of 60°. It does not require bottom heat. Leaf-mould is a good manure. It must not be pruned, for excessive bleeding always follows.

MANGO GINGER. *Curcuma amada*.

MANGO TREE. See *Mangifera*.

MANICARIA saccifera. A fine palm tree. Seeds. Rich loam.

MANNA. *Alhagi*.

MANNA ASH. *Ornus rotundifolia*.

MANULEA. Eleven species. Chiefly green-house annuals and evergreen shrubs, or stove herbaceous perennials. Cuttings or seeds. Peat and sand, or vegetable mould.

MANURES. Manures are animal, vegetable and mineral; they directly assist the growth of plants, first, by entering into their composition; secondly, by absorbing and retaining moisture

from the atmosphere; thirdly, by absorbing the gases of the atmosphere; fourthly, by stimulating the vascular system of the plants. Manures approximately assist vegetation, first, by killing predatory vermin and weeds; secondly, by promoting the decomposition of stubborn organic remains in the soil; thirdly, by protecting incumbent plants from violent changes of temperature.

All these properties seldom if ever occur in one species of manure, but each is usually particularized by possessing one or more in a superior degree. That is the most generally applicable manure, which is composed of matters essential to the growth of plants: the chief of these are carbon, hydrogen, and oxygen; therefore all animal and vegetable substances are excellent manures. It would evidently be of great benefit, if every plant could be manured with the decaying parts of its own species; the ancients made this a particular object. We read that those vines were the most fruitful, which were manured with their own leaves and prunings, and the skins of expressed grapes. This rule might be so far followed, as that the stems of potatoes, peas, &c., could be dug respectively into the compartments where those crops are intended to be grown in the following year.

Of the less general manures which benefit plants by entering into their composition, a few words will suffice. Sulphate of lime (gypsum) is a component of clover, lucerne, turnips, &c.; hence it has been applied with benefit to these crops on such soils as did not already contain it. Bones broken small have lately become a very general manure; their utility is easily accounted for. The bones of oxen contain about fifty per cent. of gelatine, which is soluble in water, and rapidly becomes putrescent. The remainder is chiefly phosphate and carbonate of lime, salts which are components of wheat, rye, barley, oats, peas, beans, vines, cucumbers, potatoes, garlic, onions, truffles, &c.

Common salt also is employed as a manure, and is beneficial, partly in consequence of entering into the constitution of plants.

Some manures ameliorate a soil by absorbing moisture from the atmosphere. This property is at least as beneficial to ground that is aluminous as to that

which is siliceous; for it is equally useless to either during such periods of the year as are characterized by a plentiful deposition of rain; but in the drought of summer, when moisture is much wanting to plants, it is beneficial to both; in very dry seasons it is even of greater importance to clayey than to light soils; for vegetation on the former suffers more from long continued drought than on the latter, inasmuch as that moisture being equally exhaled from each, the surface of the clayey soil becomes caked and impervious to air, the only grand source of compensatory moisture that is available to the languishing plants, and which is more open to those which grow on light, and, consequently, more pervious soils.

The following table of the comparative absorbent powers of many manures, is extracted chiefly from *An Essay on the Use of Salt in Agriculture*, by Mr. Cuthbert Johnson.

	Parts.
Horse-dung evaporated previously to dryness, at a temperature of 100°, absorbed during an exposure of three hours to air saturated with moisture at 62°	145
Putrefied tanners' bark, under similar circumstances (66°)	145
Unputrefied tanners' bark	115
Cowdung	130
Pig dung	120
Sheep dung	81
Pigeon dung	50
Refuse marine salt (60°)	49½
Soot (68°)	36
Burnt clay	29
The richest soil (in one hour)	23
Coal ashes	14
Lime (part carbonate)	11
Crushed rock salt	10
Gypsum	9
Chalk	4

The absorbing power of a manure is much influenced by the state in which it is presented to the atmosphere. In a finely divided state mere capillary attraction assists it; hence, the importance of keeping the soil frequently stirred by hoeing, &c. But a mere mass of cotton, by means of capillary attraction, will absorb moisture from the air, yet it parts with it at a very slight elevation of temperature: it is of importance therefore to ascertain which

are the manures that not only absorb but retain moisture powerfully. The following results of my experiments throw some light on this point:—

Pig dung evaporated to dryness at a temperature of 106°, and then moistened with six parts of water, required for being reduced to dryness again, at the above temperature	135'
Horse-dung under similar circumstances	90
Common salt	75
Soot	75
Rich soil	32
Chalk	29
Poor soil (siliceous)	23
Gypsum	18

These experiments point out a criterion by which we easily ascertain the comparative richness of any two given soils or manures; the most fertile will be most absorbent and retentive.

Some manures increase the growth and vigour of plants by stimulating their absorbent and assimilating organs.

The stimulating powers of excrementitious manures arise from the salts of ammonia they contain.

Sir H. Davy found vegetation assisted by solutions of muriate of ammonia (sal-ammoniac), carbonate of ammonia (volatile salt), and acetate of ammonia. Night soil, one of the most beneficial of manures, surpasses all others in the abundance of its ammoniacal constituents in the proportion of three to one. It may be observed, that the nearer any animal approaches to man in the nature of its food, the more fertilizing is the manure it affords.

I have no doubt that a languishing plant, one, for example, that has been kept very long with its roots out of the earth, as an orange tree recently imported from Italy, might be most rapidly recovered, if its stem and branches were steeped in a tepid weak solution of carbonate of ammonia, and when planted, an uncorked phial of the solution were suspended to one of the branches, to impregnate the atmosphere slightly with its stimulating fumes.

Manures are also of benefit to plants by affording some of the gases of the atmosphere to their roots in a concentrated form. A soil, when first turned up by the spade or plough, has generally a red tint, of various intensity,

which by a few hours' exposure to the air subsides into a gray or black hue. The first colour appears to arise from the oxyde of iron which all soils contain, being in the state of the red or protoxide; by absorbing more oxygen during the exposure, it is converted into the black or peroxide. Hence one of the benefits of frequently stirring soils; the roots of incumbent plants abstract the extra dose of oxygen, and reconvert it to the protoxide. Coal ashes, in common with all carbonaceous matters, have the power of strongly attracting oxygen. Every gardener may have observed how rapidly a bright spade of iron left foul with coal ashes, becomes covered with rust, or red oxide.

All animal and vegetable manures absorb oxygen from the air during putrefaction? If it be required of what benefit this property is to plants, since the gases are freely presented to them in the atmosphere, it admits the ready answer, that they enjoy the additional quantity which is thus collected to the vicinity of their roots, without the latter source being diminished; and that plants are benefited by such additional application to their radiculæ has been proved by the experiments of Mr. Hill.

The question may also be asked, whether the roots have the power to extract the oxygen from its combination? That they have this power admits of little doubt, since Saussure found that they were able to extract various saline bodies from their combinations; not only extracting but selecting in those cases where several salts were in the same solution.

Dr. Daubeny, the Oxford professor of agriculture, has also shown that strontian is rejected by barley, pelargoniums, and the winged pea.

Carbonic acid is also of benefit to plants, when applied to their roots in an advanced stage of their growth. Animal and vegetable matters evolve this gas whilst putrefying; and I am not aware of any manure that absorbs it from the atmosphere, so as to be for that reason beneficial to vegetation. Lime attracts it rapidly, but combines with it so strongly that it is useless to the plant, until the carbonate of lime so formed is imbibed and elaborated.

Manures assist plants by destroying predatory vermin and weeds. This is

not a property of animal and vegetable manures—they foster both those enemies of our crops. Salt and lime are very efficient destroyers of slugs, snails, grubs, &c.

Stable manure, and all decomposing animal and vegetable substances, have a tendency to promote the decay of stubborn organic remains in the soil, on the principle that putrescent substances hasten the process of putrefaction in other organic bodies with which they come in contact. Salt, in a small proportion, has been demonstrated by Sir J. Pringle to be gifted with a similar septic property, and that lime rapidly breaks down the texture of organized matters is well known.

There is no doubt that rich soils, or those abounding in animal and vegetable remains, are less liable to change in temperature with that of the incumbent atmosphere, than those of a poorer constitution. This partly arises from causes explained when treating of the influence of the colour of soils upon vegetation. Some manures, as salt, protect plants from suffering by sudden reductions of temperature, by entering in their system; stimulating, and rendering them more vigorous, impregnating their sap, and, consequently, rendering it less liable to be congealed.—*Princ. of Gardening.*

MAPLE. *Acer.*

MARANTA. Fifteen species. Stove herbaceous perennials. Division. Light rich soil.

MARATTIA. Two species. Stove perennial ferns. Division or seeds. Loam and peat.

MARCEZIA *excoriata*. Stove shrub. Cuttings. Rich light loam.

MARCGRAVIA. Two species. Curious stove evergreen shrubby creeping plants. Cuttings. Turfy loam and peat.

MARCH is a busy month, as will appear from the following calendrical directions:—

KITCHEN GARDEN.

Alexanders, sow; earth up.—*Angelica*, sow or plant.—*Artichokes*, dress; plant.—*Asparagus*, sow; plant; force; and dress beds.—*Balm*, plant.—*Basil*, sow.—*Beans*, plant; earth up.—*Beet*, (red, white, and green), sow.—*Borage*, sow.—*Borecole*, sow, e.—*Brocoli*, sow.—*Burnet*, plant and sow.—*Cabbages*,

plant; sow.—*Cardoons*, sow, e.—*Carroway*, sow.—*Carrots*, sow, e.—*Cauliflowers*, plant from frames; give air to those under glass; prick out spring-raised; sow, b.—*Celeriac*, sow.—*Celery*, sow; dress and earth up.—*Chamomile*, plant.—*Chervil*, sow.—*Chives*, plant.—*Clary*, sow.—*Cress*, sow.—*Composts*, prepare.—*Coriander*, sow, e.—*Corn Salad*, sow.—*Dill*, sow.—*Dung*, prepare for hot-beds.—*Fennel*, sow or plant.—*Garlick*, plant.—*Horse-radish*, plant.—*Hot-beds*, make, line, &c.—*Hyslop*, sow, e.—*Jerusalem Artichokes*, plant.—*Kale* (Sea), plant or sow; force.—*Kidney Beans*, sow; attend to those forcing.—*Lavender*, plant.—*Leeks*, sow.—*Lettuces*, sow; prick out, and plant out from frames.—*Liquid Manure*, give to cabbages, &c.—*Liquorice*, plant, b.—*Marigolds*, sow.—*Marjoram*, sow and plant.—*Mint*, plant; clean beds.—*Mushroom Beds*, attend to; make.—*Mustard and Cress*, sow.—*Nasturtiums*, sow.—*Onions*, sow, put out buttons or setts, plant for seed, b.; (Potato and Tree), plant.—*Orach*, sow.—*Parsley*, (Coin and Hamb.) sow.—*Parsnips*, sow.—*Peas*, sow.—*Pompions* and *Purslane*, sow, e.—*Potatoes*, plant.—*Pennyroyal*, plant.—*Radishes*, sow; —*Rampion*, sow.—*Rape* (com. and edible-rooted), sow, e.—*Rhubarb*, sow, b.; plant, b.—*Rochambole*, *Rosemary* and *Rue*, plant.—*Sage* and *Shallots*, plant.—*Salsafy* and *Scorzonera*, sow.—*Savoy*, sow.—*Skirrets* and *Succory*, sow.—*Sorrels*, plant and sow.—*Spinach*, sow.—*Tansy* and *Tarragon*, plant.—*Tetragonia* and *Thyme*, sow, e.—*Tomato*, sow in hot-bed.—*Turnips*, sow.—*Wormwoods*, sow.

ORCHARD.

Apricots, prune, if before neglected, b.; young ones, head down.—*Blossoms* of wall fruit protect.—*Currants*, finish planting and pruning, b.—*Espaliers*, generally finish regulating, b.—*Figs*, prune and train, and plant, being best time; make layers; plant cuttings.—*Fork over* the borders and quarters, if before omitted.—*Gooseberries*, prune, if before neglected, b.; finish planting, b.—*Grafting*, in mild weather, is best done this month.—*Grafts*, prepare.—*Mulch* round the trees newly planted, to keep the roots moist.—*Nectarines*, neglected before, prune, b.; young, head down.—*Peaches*, before neglected,

prune, b.; young, head down.—*Planting* omitted complete, b.—*Pruning*, complete, without fail, b.—*Raspberries*, finish planting, b.—*Strawberries*, finish dressing, b.; plant; and in pots for successive forcing.—*Suckers*, for stocks, may be planted.—*Support* with stakes trees newly planted.—*Stocks*, raise from seeds of Apples, Pears, Quinces, and Medlars.—*Trench, &c.* ground for planting.—*Vines*, finish pruning without fail, b.; plant cuttings, and make layers.

FLOWER GARDEN.

Annals (Tender), prick out in hot-bed; give air freely; and sow to blow from July to Oct.; (Hardy), sow in borders, and pot to remain.—*Anemones*, finish planting.—*Auriculas*, plant off-sets; sow; and dress where omitted last month.—*Biennials*, sow, e.—*Bulbs*, finish planting.—*Carnations*, sow; raised by layers last year plant out.—*Chrysanthemums*, raised from cuttings, plant from frames into pots.—*Cleanliness* is now even more than ordinarily requisite.—*Dahlias*, sow; prick out; plant cuttings of roots; all in a gentle hot-bed.—*Dress* borders generally, if omitted before.—*Earth*, give fresh to plants in pots.—*Edgings* of Box, &c., may be made.—*Evergreens*, sow; plant and prune in mild weather.—*Forest Trees*, sow; cut down in shrubberies, &c.—*Grass Seeds*, sow.—*Gravel*, weed, turn, lay, and roll twice a week in dry weather.—*Hand Glasses* and a warm border will now do for Tender Annuals.—*Hedges*, finish making.—*Hot-beds*, for tender Annuals, make; give air freely; protect at night; day temp. to be kept about 70°.—*Hyacinths*, put fresh tan or saw-dust on beds.—*Layers*, make of the Arborescent Chinese Peonies, &c.—*Perennials*, plant and water, they will blow same year; sow.—*Polyanthuses*, divide roots and sow.—*Pots* of Roses and other flowers put in hot-house, for succession produce.—*Protection*, give to Auriculas and other choice flowers in bud.—*Roses*, prune, b.; plant cuttings of roots; plant established trees, and if repeated in April and May, b., a succession of flowers may be had until September ends; give liquid manure.—*Shrubs*, generally finish pruning and planting.—*Stake* newly planted, and all pliant shrubs, &c.—*Sweet Briar* for hedges, &c., sow where to remain.—*Tulips* (Early), protect bloom.—*Turf*

may be laid.—*Water* frequently, but moderately, and only in mild weather.

HOT-HOUSE.

Air, admit freely.—*Cherries* ripening require but little water.—*Flowers* in pots continue to introduce.—*Kidney Beans*, continue forcing.—*Leaves*, clean by the sponge and syringe.—*Pines* require more water, and greater heat; syringe their crowns; give liquid manure; shift into larger pots.—*Peaches*, thin; the day temp. for them should not exceed 70°; disbud; trim; water abundantly.—*Propagate* hot-house plants by slips, cuttings, suckers, and layers, according to the plant's nature; it is the best season.—*Seedlings* of culinary plants, remove to a cooler place.—*Strawberries*, in pots, continue forcing.—*Temperature* for Pines should be about 85° at midday, and during night 60°; in the flower stove 65° and 55°.—*Tobacco* fumigations continue.—*Vines* are now all in motion; thin; train; keep well supplied with liquid manure; air keep moist, except to those in blossom; temp. as last month.

GREEN-HOUSE.

Air cannot be admitted too freely during fine weather and the temperature above 32°.—*Earth* (fresh), give to oranges and other shrubs; stir the surface of that in the pots frequently.—*Heading-down* may be practised upon oranges and other shrubs growing irregularly.—*Leaves*, clean and remove those decayed.—*Orange Kernels*, sow to raise stocks.—*Pot* singly last year's cuttings.—*Propagate* by slips, cuttings, and layers as appropriate.—*Pruning*, finish.—*Shifting*, complete, where necessary.—*Sow* seeds of green-house plants in pots, and plunge in a hot-bed. *Water* frequently, but moderately.—*Windows* always close at night.—*Wood*, dead and weakly, remove.

MARGINS of streams and other waters must always accord with the pleasure grounds in which they are placed. Art, therefore, must imitate each in its proper place, not always by a studious picturesque arrangement of the marginal accompaniments in each case, but by excavating the groundwork, planting the trees and shrubs, and leaving the rest to the motion of the waves of the water. After the effects of one winter, stones or gravel may be deposited in

spots suitable for stony or gravelly shores.

MARICA. Ten species, chiefly green-house herbaceous perennials. *M. patudosa* is a stove aquatic. Division of seeds. Loam, peat, and sand.

MARIGOLD. *Calendula officinalis*.

Varieties.—Single; Common double; Largest very double; Double lemon-coloured; Great Childing; Small Childing. The single-flowered and those which have the darkest orange colour, are most esteemed, as possessing the most flavour.

Soil and Situation.—The soil most suited to them is one that is light, dry, and poor. In rich ground they grow larger and more luxuriant, but lose much of their flavour and quality. The situation cannot be too open and exposed.

Sowing may be from the close of February until June; or it may be performed in autumn, during September. If left to themselves, they will never fail to multiply from the self-sown seed. Sow in drills, ten inches apart; the plants are best left where raised, being thinned to ten or twelve inches asunder; but when the seedlings are two or three inches in height, they may be removed into rows at similar distances as above. Water must be given moderately every other day, until established.

Gathering.—The flowers, which the spring-raised plants will produce in the June of the same year, but those of autumn not until that of the following one, will be fit to gather for keeping in July, when they are fully expanded, as well as for use when required. Before storing, they must be dried perfectly, otherwise they become mouldy and decay.

To obtain Seed.—Plants of each variety must be grown as far distant from each other as may be. The two childing, and the largest double marigolds, are especieable liable to degenerate, if the seed is not carefully taken from the largest and most double flowers.

MARJORAM. (*Origanum*.) *O. marjorana*. Sweet or Summer Marjoram. *O. heracleoticum*. Winter Marjoram. *O. onites*. Common or Pot Marjoram.

Soil and Situation.—A light, dry and moderately fertile soil is required for their healthy growth; and if it is one that has not been cropped for a considerable time, it is the more favourable

for them. If the soil is wet or rich, they are deficient in their essential qualities, and the perennials are unable to withstand severe weather. The situation cannot be too open.

Time and Mode of Propagation.—The sweet marjoram is propagated solely by seeds; the two perennials by seed, as well as by parting their roots, and slips of their branches. Sowing may be performed of all the species, from the conclusion of February, if open weather, to the commencement of June; but the early part of April is the usual time for performing it. Portions of the rooted plants, slips, &c., may be planted from February until May, and during September and October.

The sowing is performed either in drills, six inches apart, or broadcast; in either case the seed being buried not more than half an inch deep. When the seedlings have attained a height of two or three inches, they must be thinned to six inches, and those removed may be pricked in rows at a similar distance apart each way. Those of the annual species are to remain; but those of the perennials, to be finally removed during September, at the distances directed below, when raised from slips, &c., water being given at every removal, and until the plants are established.

The slips and partings of the root, are inserted in rows ten or twelve inches apart, where they are to remain; they must be watered moderately every evening, and shaded during the day, until they have taken root, which they soon do, and acquire a stocky growth.

The only cultivation that any of the species require, is the frequent application of the hoe. In October the decayed parts of the perennials are cut away, and some soil from the alleys scattered over the bed about half an inch in depth, the surface of the earth between the stools being previously stirred gently.

The tops and leaves of all the species are gathered when green in summer and autumn, for use, in soups, &c.; and a store of the branches are cut and dried in July or August, just before the flowers open for winter's supply.

To obtain Seed.—There is little difficulty in obtaining the seed of the pot marjoram; if a plant or two are left ungathered from, it unfailingly ripens in the course of the autumn. But the exotic species seldom ripen theirs in

this country; consequently it is usually obtained from the south of France or Italy. In favourable years, however, they sometimes perfect it late in autumn.

Forcing.—When the green tops are much in request a small quantity of seed of the summer marjoram is sown in January or February, in a moderate hot-bed.

MARL is a compound of chalk (carbonate of lime) with either siliceous sand or alumina. In the first instance, it is a siliceous marl, best applied to heavy soils; and in the latter a clayey marl, adapted for light lands. Slaty and shellmarls are varieties of the siliceous. The relative proportions of the constituents vary indefinitely, the chalk amounting from 15 to 75 per cent. The quantity applied per acre must also vary greatly, according to the object to be attained. To render a light soil more tenaceous 100 tons per acre of clayey marl are not too much; neither is the same quantity of siliceous marl an excess, if applied to a heavy soil to render it more friable. For much useful information on this subject, see "Ruffin on Calcareous Manures," a Virginia publication.

MARLEA *begoniæfolia*. Green-house evergreen shrub. Half-ripened cuttings. Peat and loam.

MARRUBIUM. Nine species. Hardy herbaceous perennials. Division or seed. Common soil.

MARSHALLIA. Four species. Half-hardy herbaceous perennials. Cuttings. Loam and peat.

MARSH MALLOW. *Althæa*.

MARTYNIA. Four species. Stove or green-house annuals. Seeds. Light rich soil.

MASDEVALLIA *infracta*. Stove orchid. Division. Wood.

MASSONIA. Thirteen species. Green-house bulbous perennials. Offsets or seeds. Loam, peat and sand.

MASTERWORT. *Astrantia*.

MASTIC. *Majorana crassifolia*.

MASTICH. *Thymus mastichina*.

MASTICH TREE. *Pistacia lentiscus*.

MATHIOLA. The Stock. Twenty-two species and several varieties. The hardy annuals and biennials, and the half-hardy shrubby kinds, increase by seeds, and grow well in loam and peat. The green-house evergreen shrubby

species, cuttings, light soil and sand. See *Stock*.

MATTIA. Two species. Hardy herbaceous perennials. Division. Common soil.

MAURANDYA. Three species. Green-house evergreen twiners. Young cuttings or seeds. Light rich soil.

MAURITIA. Three species. Palms. Rich sandy loam, and a strong moist heat.

MAXILLARIA. Fifty-four species. Stove epiphytes. Division. Wood.

MAXIMILIANA *regia*. Palm. Rich sandy loam, and a good moist heat.

MAY requires the gardener's especial care in every department of his grounds.

KITCHEN GARDEN.

Angelica, sow.—*Artichokes*, plant, b.; clean beds.—*Asparagus*, keep clean; apply liquid manure.—*Balm*, plant.—*Basil*, plant out.—*Beans*, sow, hoe, top.—*Beet*, (Red,) thin; (White and Green), sow.—*Borage*, sow.—*Borecole*, sow, b.; plant; prick out; plant out; hoe; leave for seed.—*Brocoli*, sow, b.; plant; prick out.—*Burnets*, sow and plant.—*Cabbages*, sow; plant; earth up.—*Capsicum*, plant out.—*Carrots*, sow; thin.—*Cardoons*, sow, b.—*Cauliflowers*, take glasses from; sow the late variety for autumn use.—*Celery*, sow, b.; prick out; plant out; water; leave for seed.—*Chamomile*, plant.—*Chervil*, sow; leave for seed.—*Chives*, plant.—*Coriander*, sow; leave for seed.—*Cress*, sow; (Water), plant.—*Crops*, failed, replace forthwith.—*Cucumbers*, prick out; plant out; attend to forcing.—*Dill*, sow, and plant.—*Earthing-up*, attend to.—*Endive*, sow, e.; leave for seed.—*Fennel*, sow and plant.—*Finochio*, sow; clean.—*Hot-beds* attend to; linings, &c.—*Hyssop*, sow and plant.—*Kale*, (Sea,) attend to blanching, &c.—*Kidney-Beans* (dwarfs), sow, b.; (runners) sow.—*Lavender* plant.—*Leeks*, sow; thin; leave for seed.—*Lettuces*, sow; plant out; tie up.—*Mari-golds*, sow.—*Marjorams*, sow and plant.—*Melons*, sow, b.; prick out; ridge out; attend to forcing; thin laterals.—*Mint*, plant.—*Mushroom-beds*, make, b.; attend to those producing.—*Mustard* and *Cress*, sow; leave for seed.—*Nasturtiums*, sow, b.—*Onions*, weed, &c.; sow for planting again in spring; (Welch), leave for seed.—*Parsley*, sow; leave for seed; (Hamburg), thin.—*Parsnips*,

thin, &c.—*Peas*, sow; top those blooming.—*Pennyroyal*, plant.—*Pompions*, sow, b.; ridge out, b.—*Potatoes*, plant, b.; hoe.—*Purslane*, sow; leave for seed.—*Radishes*, sow; leave for seed.—*Rape*, for salading, sow; (edible-rooted), sow, e.—*Rosemary*, plant.—*Rue*, plant.—*Sage*, plant.—*Salsafy*, thin, &c.—*Savory*, sow and plant.—*Savoy*s, sow, b.; plant; prick out.—*Scorzenera*, thin, &c.—*Sorrels*, sow and plant.—*Spinach*, sow; thin; leave for seed.—*Tansy*, and *Tarragon*, plant.—*Thyme*, sow and plant.—*Tomatoes*, plant out.—*Turnips*, sow; thin.—*Turnip-Cabbage*, sow.—*Watering*, attend to in dry weather.—*Weeds*, destroy as they appear.

ORCHARD.

Apples (Wall and Espalier), trim and train, e.—*Apricots*, trim and thin their fruit.—*Budded Trees*, remove shoots from stocks below the buds.—*Grafts*, remove clay and loosen bandages from, e.; remove shoots from stock.—*Insects*, watch for and destroy with lime-dust, tobacco, or other application.—*Mulch*, continue round late-planted trees.—*Nectarines*, trim and train; thin fruit.—*Peaches*, trim and train; thin fruit.—*Pears* (Wall and Espalier), trim and train, e.—*Plums* (Wall and Espalier), trim and train, e.—*Salt*, strewn along the top of a wall, prevents slugs and snails coming over from the shaded side.—*Snails*, destroy; they are very destructive now to wall-fruit, especially nectarines.—*Vines*, trim and train; hoe frequently those in vineyard.—*Wall Trees* generally require training this month.—*Water*, apply by the engine to wall-trees and espaliers; give to newly-planted trees, in dry weather, frequently.

FLOWER GARDEN.

Anemones, take up, and separate offsets as leaves decay.—*Annuals*, remove from hot-bed to borders.—*Auriculas*, done blooming, remove to north-east aspect, where they will not have the sunshine after nine; offsets, detach and plant; seedlings, keep in the shade; water moderately in dry weather.—*Awnings* or other shelter, continue over beds of hyacinths, tulips, &c., now in bloom.—*Biennials*, sow, b.—*Bulbous Roots*, generally, directly leaves decay, take up and store; seedlings, shade

during midday; (Autumn blooming), plant again after separating offsets, or else store until end of July.—*Carnations*, remove side-buds from flower-stems; shade from meridian sun; water in dry weather; sow.—*Dahlias*, plant out from green-house; e.—*Dress* the borders, &c., almost daily.—*Evergreens* may be planted, b.—*Fibrous-rooted* perennials, propagate by cuttings of young flower-stalks.—*Flowering-Plants* require staking, &c.—*Grass*, mow and roll weekly.—*Gravel*, roll weekly.—*Hoeing* cannot be too frequent.—*Hyacinths*, take up and store as leaves decay.—*Mignonette*, sow for succession, b.—*Perennials*, sow, b.; propagate by slips and cuttings.—*Polyanthuses*, part, if not done in April; shade, and throughout the summer, sunshine destroys them.—*Roses*, this is the best season for budding.—*Stake* and tie up plants; seedlings, thin.—*Tulips*, remove seed-pods; take up and store as leaves decay.—*Turf* may be laid, and grass-seed sown, b.; water frequently in dry weather.—*Wall-flowers*, sow, to bloom next year.—*Water-glass* bulbs, plant in borders as flowers decay.—*Watering*, attend to in dry weather, especially to plants newly removed.

HOT-HOUSE.

Air, admit as freely as possible.—*Bark-Beds* may be renewed, if not done in April.—*Figs*, keep well watered; pick off laterals.—*Fruit Trees*, in forcing, for treatment see *April*.—*Grapes*, gather before dead ripe, and hang in grape-room.—*Pines*, water every fourth morning; shift last year's crowns, if not done in April, b.; temperature at night 75°, and at midday 100°.—*Potted Plants* may yet be shifted, b.; shade for a few days after.—*Propagate* by seeds, cuttings, &c., if before omitted.—*Pruning* should have been finished last month; pinch down the fruit-shoots.—*Strawberries*, fruiting, give liquid-manure.—*Syringing*, generally, as fruit ripens, discontinue.—*Vines*, keep at a night temperature of 70°, and at midday 85°; when grapes are beginning to ripen cease from syringing; remove superfluous shoots.—*Water*, supply very frequently, but moderately.—*Work*, general, required. (See *April*.)

GREEN-HOUSE.

Air is now so essential that potted

plants of hardier kinds move to outside.—*Cuttings* of some plants will still grow.—*Earth*, is pots, stir.—*Layering* will yet be successful.—*Leaves*, clean, before removing from house.—*Orange-stocks*, seedlings pot singly; in arching of the orange and lemon may yet be practised.—*Pruning* must now be only casual.—*Shifting* into larger pots complete, b.—*Succulent Plants*, as aloes, &c., may be moved out, c.—*Water* frequently but moderately; it may be poured freely over their foliage as a cleanser.—*Windows* and doors open daily, and during mild nights, to harden before moving out.

MAY APPLE. *Podophyllum peltatum*.

MAZENUS. Four species. Half-hardy or green-house evergreen shrubs or trees. Ripe cuttings. Peat, loam, and sand.

MAZE. See *Labyrinth*.

MAZUS *pumilio*, a hardy annual; and *M. rugosus*, a half-hardy trailing annual. Seeds. Common soil, and a warm situation.

MEADOW-SAFFRON. *Colchicum*.

MEADOW-SWEET. *Spiraea ulmaria*.

MEASURES, ENGLISH.

GRAIN MEASURE.

4 Gills	make	1 Pint	containing	34½	Cubic Inches.
2 Pints		1 Quart		69½	“ “
4 Quarts		1 Gallon		277½	“ “
2 Gallons		1 Peck		554½	“ “
4 Pecks		1 Bushel		2218½	“ “
4 Bushels		1 Sack		5½	“ Feet.
8 Bushels		1 Quarter		10¼	“ “
5 Quarters		1 Load		51½	“ “

TIMBER MEASURE.

A load of timber, unhewn, is 40 cub. ft.	A load of 2½ inch plank	240 sq. ft.
squared, 50 “	3 “	200 “
1 inch plank 600 sq. ft.	3½ “	170 “
1½ “ 400 “	4 “	150 “
2 “ 300 “		

LAND MEASURE.

The *English* statute acre contains 4840 square yards; the *Scotch*, 5760; the *Irish*, 7840; the *Devonshire*, customary, 4000; the *Cornish*, 5760; the *Lancashire*, 7840; the *Cheshire* and *Staffordshire*, 10,240; the *Wiltshire* tenant-ry, 3630. The *French* arpent is an English acre and three-fourths of a rood. The *Strasburg* acre is nearly half an English acre; the *Prussian* morgen is not quite three-fourths of an acre.

LONG MEASURE.

12 Inches	1 Foot.	40 Poles	1 Furlong.
3 Feet	1 Yard.	8 Furlongs	1 Mile.
6 Feet	1 Fathom.	3 Miles	1 League.
5½ Yards	1 Pole.	69½ Miles	1 Degree.

SQUARE MEASURE.

Inches.	Feet.	Yards.	Poles, Rods, or Perches.	Roods.	Acre.
144	1				
1,296	9	1			
39,204	272½	30½	1		
1,568,160	10,890	1210	40	1	
6,272,640	43,560	4840	160	4	1

30 Acres are 1 Yard of Land.
100 1 Hide of Land.
640 1 Square Mile.

CUBIC MEASURE.

1728	Cubic Inches	make	. . .	1 Cubic Foot.
27	"	Feet	. . .	1 " Yard.
40	"	" of Rough Timber	} 1 Load.	
50	"	" of Hewn do.		
108	"	"	. . .	1 Stack of Wood.
128	"	"	. . .	1 Cord.

LONDON MARKET FRUIT AND VEGETABLE MEASURES.

These being made either of osier or deal shavings, vary triflingly in size more than measures made of less flexible materials. They are as follow:—

Sea-Kale Punnets.—Eight inches diameter at the top, and seven inches and a half at the bottom and two inches deep.

Radish Punnets.—Eight inches diameter, and one inch deep, if to hold six hands; or nine inches by one inch for twelve hands.

Mushroom Punnets.—Seven inches by one inch.

Salading Punnets.—Five inches by two inches.

Half-Sieve.—Contains three imperial gallons and a half. It averages twelve inches and a half diameter, and six inches in depth.

Sieve.—Contains seven imperial gallons. Diameter, fifteen inches; depth, eight inches.

Bushel-Sieve.—Ten imperial gallons

and a half. Diameter at top, seventeen inches and three quarters; depth, eleven inches and a quarter.

Bushel-Basket.—Ought, when heaped, to contain an imperial bushel. Diameter at bottom, ten inches; at top, fourteen inches and a half; depth, seventeen inches. Walnuts, nuts, apples, and potatoes are sold by this measure. A bushel of the last-named, cleaned, weighs 56 lbs., but 4 lbs. additional are allowed if they are not washed.

A Pottle is a long tapering basket that holds about a pint and a half.

Hand.—Applies to a bunch of radishes, which contains from twelve to thirty, according to the season.

A Bundle contains six to twenty heads of brocoli, celery, &c.; and in the case of asparagus from 100 to 150.

A Bunch is applied to herbs, and varies much in size according to the season.

HEAPED MEASURES.

English market-gardeners, and retailers of fruit, potatoes, &c., generally vend their commodities as if the Act of Parliament, 5 and 6 Will. IV. c. 63, did not exist. By this statute selling by heaped measure is forbidden under a penalty of not more than 40s. for every such sale. Section 8 provides that, as some articles heretofore sold by heaped measure are incapable of being stricken, and may not inconveniently be sold by weight, it is enacted, that all such articles may henceforth be sold by a bushel-measure, corresponding in shape with the bushel prescribed by the 5 Geo. IV. c. 74, for the sale of heaped measure, or by any multiple or aliquot part thereof, filled in all parts as nearly to the level of the brim as the size and shape of the articles will admit; but nothing herein shall prevent the sale by weight of any article heretofore sold by heaped measure. The 5 Geo. IV. c. 74, thus referred to, enacts, by section

7, that for potatoes, fruit, &c., the bushel shall be made round, with a plain and even bottom, and being nineteen inches and a half from outside to outside, and capable of containing 80lbs. weight of water.

Of Wood Fuel.—*English Measure.*—Wood-fuel is assized into shids, billets, faggots, fall-wood, and cord-wood. A shid is of fall-wood and cord-wood.

A shid is to be four feet long, and, according as they are marked and notched, their proportion must be in the girth: viz., if they have but one notch they must be sixteen inches in the girth; if two notches, twenty-three inches; if three notches, twenty-eight inches; if four notches, thirty-three inches; and if five notches, thirty-eight inches about.

Billets are to be three feet long, of which there should be three sorts; namely, a single cask, and a cask of two. The first is seven inches; the se-

cond ten inches; and the third fourteen inches about. They are sold by the hundred of five score.

Faggots are to be three feet long, and, at the band, of twenty-four inches about, besides the knot; of such faggots fifty go to the load.

Bavins and *Spray-wood* are sold by the hundred, which are accounted a

load. Cord-wood is the bigger sort of fire-wood; and it is measured by a cord or line, whereof there are two measures—that of fourteen feet in length, three feet in breadth, and three feet in height; the other is eight feet in length, four feet in height, and four feet in breadth.

MEASURE OF WOOD.

1000 Billets of Wood	=	1 Cord.
10 Cwt. of Wood	=	1 Cord.
1 Cord of Wood	=	$\frac{1}{2}$ Chaldron of Coals.
100 Lbs. of Wood	=	1 Quintal of Wood.

M E C O N O P S I S. Three species. Hardy herbaceous perennials. Seeds. Light soil.

M E D I C A G O. Seventy-two species. Chiefly hardy annuals, and, for the most part, trailers. The herbaceous perennial kinds are increased by division; the shrubby species by cuttings; and the annuals by seed. Common soil suits them all.

M E D I C K. *Medicago*.

M E D I N I L L A *erythrophylla*. Stove evergreen shrub.

M E D L A R. *Mespilus germanica*.

Varieties.—Blake's Large; Dutch, largest fruit; Nottingham, small, but best flavoured; Stoneless, inferior, but keeps longer than others.

Propagation by Seed.—This is a tedious mode, the seed usually lying two years before it germinates. Sow immediately the fruit containing the seed decays, in common light soil. Water the seedlings frequently in dry weather; thin them to two feet apart; and when four or five years old they will be fit for final planting.

By Layers.—This may be done in February and March, making use of shoots of the previous year. They will have rooted by the autumn.

Grafting and Budding may be done on the White Thorn, but the Pear is a better stock for the medlar.

Soil.—A well-drained, but retentive loam suits it best.

Planting, Pruning, &c.—See the directions given for the Pear.

Storing.—The fruit ought not to be gathered until November, for if the gathering is made before the fruit is fully matured, it shrivels without ripening in its decay. Spread them singly upon sand, the calyx, or open side

downwards, and dipping the stalk end in a strong brine of common salt and water, which is said to check the occurrence of mouldiness.

M E G A C L I N I U M. Three species. Stove epiphytes. Division. Wood.

M E G A S T A C H Y A. Nine species. Grasses. Chiefly annuals. Seeds. Common soil.

M E L A L E U C A. Forty-six species. Green-house evergreen shrubs. Half-ripened cuttings. Loam, peat, and sand.

M E L A N T H I U M. Eight species. Green-house bulbous perennials. Offsets or seeds. Loam, peat, and sand.

M E L A S P H A E R U L A. Four species. Green-house bulbous perennials. Offsets. Sandy peat.

M E L A S T O M A. Twelve species. Chiefly stove evergreen shrubs. *M. elongata*, is a tuberous-rooted perennial, and very beautiful. Cuttings. Loam, peat, and sand.

M E L H A N I A. Three species. Stove or green-house evergreen trees. Cuttings. Sandy loam.

M E L I A. Nine species. Stove or green-house evergreen trees. *M. azedarach*, is deciduous: large ripened cuttings, with the leaves not shortened. Loam, peat, and sand.

M E L I A N T H U S. Three species. Green-house or hardy evergreen shrubs. Cuttings. Light rich soil.

M E L I C H R U S. Two species. Green-house evergreen shrubs. Cuttings. Sandy peat.

M E L I C O C C A. Four species. Stove evergreen fruit trees. Ripe cuttings. Light loamy soil.

M E L I C O P E *ternata*. Green-house evergreen shrub. Cuttings. Loam and peat.

MELISSA. Balm. Four species. Hardy herbaceous perennials. Division. Common soil.

MELITTA melissophyllum and two varieties. Hardy herbaceous perennials. Division. Common soil.

MELOCACTUS. Melon thistle. Fourteen species. Stove evergreen shrubs. Offsets. Sandy peat.

MELODINUS. Two species. Stove evergreen twiners. Cuttings. Loam and peat.

MELOLONTHA, the Cockchafer.

M. vulgaris. Common Cockchafer.

M. horticola. May-Bug, or Bracken-clock. Feeds upon the leaves of the Raspberry and Rose. Mr. Curtis justly observes, that—"When the roses are in full bloom in May, these beetles sometimes do very extensive mischief to the flowers, by eating out the anthers and consuming the petals. Having deposited about a hundred eggs in the earth, the female dies, and the larvæ hatch and commence their attacks upon the roots of the grass. It is stated, that they are feeding three years, and they reside about an inch beneath the turf; but as winter approaches, they retire deeper into the earth; and even in November, when frost has set in, they have buried themselves a spade deep. The larvæ are rather active and can walk tolerably well, dragging their bodies after them; they lie, however, generally curved up in the shape of a horse-shoe; the head is deep, ochreous and destitute of eyes. The body is ochreous white with a few brown hairs. To kill these larvæ, water the grass in the autumn with one-tenth gas liquor to two-tenths water, it will do no mischief to the grass, but will extirpate these miners. Where the gas liquor cannot be obtained, employ strong salt water."—*Gard. Chron.*

MELON. *Cucumis melo.*

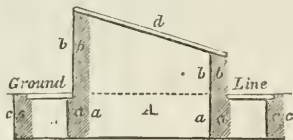
Varieties.—There are many varieties of the Melon of which the Nutmeg may be considered as the type; it and the Citron are, however, the most desirable, which have come under our observation. The mode of out-door culture is very similar to that of the cucumber; they delight in light land well manured; are quite tender, and should not be planted until all fear of frost has ceased.

To force Melons.—Although a common hot-bed is generally used for this plant, yet a pit, as it is technically

termed, is more economical, and by enabling a more regular temperature to be sustained, renders the fruit in greater perfection. The pit is a rectangular frame or bin, built of nine inch brick-work, in preference to boards, which have to be renewed every five or six years, if employed and enclosed by a glass case of the necessary dimensions. Mr. Smith, gardener to A. Keith, Esq., of Ravelstone, N. B., has suggested a mode of building a pit which renders the renewal of the heat in it easy; and as the committee appointed to examine it report, is the means of considerable saving compared with the common mode of forming an open bed. But the facility with which linings may be applied is its best feature; for if by any chance the heat failed, there was seldom any alternative in the old pits but to break them up.

The accompanying sketch will at once show the form of the pit, and Mr. Smith's mode of applying the linings. A is the pit the side of which *a a* instead of being a continuous piece of

Fig. 98.



brick-work are merely rows of pillars six feet apart; and the brick-work of the frame *b b* is supported by bars of iron reaching from pillar to pillar. An outer wall, *c c*, is constructed at two and a half feet distance from the pillars on each side; thus two bins are formed in which the linings are inserted, as is found necessary, and are kept close covered with thick boards; *d* represents the lights, which thus are formed without any wooden frames. For other modes of construction, see *Pits, &c.* If a common hot-bed is employed, fifteen barrow loads of dung is the usual allowance to each light, which make it about six inches higher than is allowed for the cucumber bed of largest dimensions. If a melon house be employed, the following is the form and mode adopted by Mr. Fleming.

"The house is twenty-eight feet long, and fifteen wide, and is heated by

Fig. 99.

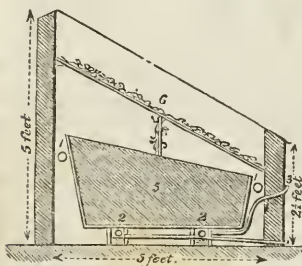


means of a saddle boiler, with four-inch pipes passing round the outside of the pit, which pipes are fitted with cast-iron troughs for holding water to regulate the moisture of the atmosphere. Beneath the pit is an arched chamber, *a*, along the front of which runs the flue, *b*, imparting a slight degree of heat to the soil above, and also serving to heat a series of arches, *c*, which run along beneath the path, and are entered from a house in front, *d*, and which are used for forcing rhubarb, &c., in the winter.” —*Gard. Chron.*

Mr. Green has published the following excellent mode of heating a melon pit with hot water:—

“The annexed figure represents a section of the pit: 1, 1, are the flow pipes and the water troughs; 3, the pipes to fill the troughs; 4, the pipe by which the water is let out of the troughs; 5, the bed for the plants; and 6, the trellis on which the shoots are trained.”

Fig. 100.



Time and Mode of Sowing.—Seed may be sown about the middle of January; but the usual time is about the same period of the succeeding month, or not even until its close, if severe weather; to be repeated towards the end of March, and lastly in the first weeks of April and May. The length of time between the sowing and cutting, depends chiefly upon the variety employed. But little time is gained by

sowing before February is well advanced, and more risk of failure incurred. On the average, fifteen weeks elapse; on the shortest and coldest days of winter eighteen; and as the spring advances it decreases to eleven or twelve; these periods necessarily varying in different years. The mode of sowing, managing the seedlings, pricking out, &c., being the same as with the cucumber, only that a few degrees higher temperature is required, I refer the reader to that head. The pots in which the seed is sown should be three or four inches deep. Each sowing is best performed twice, four or five days elapsing before the second insertion; this guards as much as possible against failure. The pots should be plunged by degrees, and not at once down to the rim. Those for pricking into must be about five inches in diameter. The first stopping is usually performed in the seed-beds.

Ridging out.—The soil must be two feet deep, and the plants inserted in the centre of each light, care being taken to remove them with as little injury as possible to the roots. The removal should take place soon after the attainment of the rough leaves, or immediately on the appearance of the lateral runners. If the bed is not ready, those from the earth of the seed-beds must be moved into pots, and those already in them turned into larger ones, from whence they may be finally removed without detriment; one plant only should be allowed to remain, for no more are required for each light. Water must be given with the precautions enumerated for cucumbers, and especial care taken not to wet the foliage, or to apply it too abundantly, and repeated two or three times until the plants are established. When completely rooted, the bed may be earthed by degrees to its full depth, sixteen inches; it being first added immediately round the cones, and pressed moderately firm as it is laid on. The pruning and training must be performed as in cucumbers, and the same precautions taken to admit air and light, and to shade and cover, &c. It is in the training and management of the foliage in particular that the generality of gardeners are careless, although the labours of the physiologist and chemist have demonstrated how important it is that every leaf should be

kept in its natural posture and vigour. So convinced was Mr. Knight of the little attention paid to this point, that he took some melon plants under his especial care. He placed one under each light, the glass of which was six feet by four; the branches were trained regularly and secured by pegs in every direction; and still further, to present the largest possible surface of foliage to the light, the leaves were held erect at equal distances from the glass. As great injury is sustained by these from the common mode of watering, it was so performed as not to touch them. By this simple additional care, the other routine of their management being the same as usual, the fruit attained an extraordinary degree of perfection, and ripened in an unusually short space of time. Mr. Knight further directs, however, that wherever a sufficient quantity of fruit is set, the production of more leaves is to be prevented, if they cannot be exposed to the light without overshadowing the fruit, by pinching off the laterals as soon as formed. No part of full-grown leaves, however, should be destroyed though far distant from the fruit.

Temperature.—The temperature requires particular attention at the time of setting and ripening; though neglect at all the stages of growth is fatal. It must never fall below 70°, or rise above 80°. The seed or nursery bed may continue about the minimum, but never below it: and the fruiting one as constantly approximating the maximum as possible until the fruit is full grown, when the temperature during the day may vary between 85° and 95°. Impregnation must be performed as directed for cucumbers. When the runners completely touch the side of the frame, if the season is genial it must be raised three or four inches by means of bricks, otherwise they must be pruned or stopped. From this, the propriety of having only one plant to a light, is evident; for the runners being often six or seven feet long, and very numerous, require, if there is not room for training, the frame to be lifted long before the season will allow it. As soon as the fruit is set they must be looked over three or four times in a week to observe which is the most vigorous and finest; of these, one that has the largest footstalk, and the near-

er the main stem the better, must be left on each runner, and all others nipped off, the runner at the same time being broken away at the third joint above it. Eight melons on one plant of the large varieties, and about twelve of the smaller are quite sufficient to be left; if more are suffered to remain, they will either be of inferior size and quality, or not ripen at all. By this pruning fresh runners are often induced; but these must in like manner be stopped, and any fruit that they may produce be removed. If a superabundance are produced, which especially, if new seed is employed, will sometimes happen, it is necessary to thin them, and in doing this the weakest and most luxuriant must alike be rejected, those of an average size being the most fruitful. It must always be kept in mind, that air should be admitted as much and as often as circumstances will allow. During mild and serene afternoons and evenings, the glasses may be entirely removed, but on no consideration left off all night. In very warm weather they may be kept off, from ten in the morning until five, a shade being afforded to the plants during the meridian if they flag at all. It is necessary, both for melons and cucumbers, that something should be laid between the fruit and the earth of the bed, otherwise it will be speckled and injured in appearance; clean straw and reeds spread in thin but regular layers are often employed for this purpose. If tiles or pieces of board are made use of, it is of considerable service in forwarding the ripening, to have them painted or charred black; but what would be still better is coal ashes spread over the surface of the bed two or three inches deep and beat smooth. This, I am of opinion, is preferable from its power of absorbing and retaining heat, and inferior in no other quality to drifted sea or river sand, recommended by Mr. Henderson, of Brechin Castle, N. B., which, he observes, extirpates the slater or woodlouse, by preventing it concealing itself from the rays of the sun; it keeps down the steam, affords a bed for the fruit as warm and as dry as tiles or slates, retains the moisture longer, whilst it becomes dry itself sooner than those coverings, and is a powerful preventive of the evil—the mildew. If

tiles or slates are employed, they must be put under the fruit as soon as it has attained the size of a walnut, the other materials immediately after the plants are well established. A regular moisture should be kept up by moderate waterings applied with the precaution intimated for cucumbers; but when the fruit is becoming ripe, water must be either altogether withheld or applied very sparingly. About thirty or forty days usually elapse between the setting and full ripeness; it must be gently turned twice or three times during a week, otherwise that side which lies constantly on the ground will be blanched and disfigured. Its maturity is intimated by a circular crack near the footstalk, sometimes by becoming yellowish; but more decidedly by the emission of a fragrant smell. The cutting should be performed early in the morning, and the fruit kept in a cool place until wanted. The whole of the stalk is left pertaining to it when cut. To prevent the fruit's bursting, it is a very successful plan to elevate the further end of the fruit as much as 30° above the stalk end.

To Obtain Seed.—For the production of seed, some fruit of the earliest raised crops must be left: of these the finest and firmest should be selected, the choice being guided by the circumstances, as are mentioned for cucumbers. No two varieties should be grown in the same frame, either when the seed is an object, for then it would be contaminated; or if the fruit is alone required; for their growth and vigour almost always differing, different treatment is required by each. Neither should cucumbers or gourds be allowed to vegetate in such a situation, as to risk mutual impregnation by insects. Both of the melon and cucumber, such seed only should be kept as sinks freely to the bottom of water. Seed is best for sowing when three or four years old; if less than two, the plants raised from it are apt to produce a superluxuriance of vine, and a multitude of male blossoms. If new seed is unavoidably employed, it should be hung in a paper or phial near the fire until wanted, or be carried in the pocket for three or four weeks. If, on the contrary, the seed is very old, it should be soaked in milk-warm water for two or three hours before sowing. When

twenty years old it has been known to produce fruitful plants.

Hand Glass Crops.—For these, plants are required from sowings of the middle of March, April, or early in May, and whose fitness for planting out, is marked by the rough leaf, &c., as intimated before.

The bed must be four and a half feet wide, in length proportionate to the number of glasses, which must be at least four feet apart; and, eight barrow loads of dung being allowed to each glass, it will be about two and a half feet high. It may be founded in a trench, if the soil is dry, but it is best constructed on the surface. The earthing, planting, and other points of management are precisely the same as for the frame crops. The temperature need not, however, be so high, the maximum required being 70°, but it must never sink below 65°, which may easily be accomplished by linings, &c. The runners must not be allowed to extend from beneath the glasses until June, or the weather has become genial and settled, but be kept within as noticed for cucumbers. When allowed to escape, all dwindled or supervigorous shoots must be removed, and the training be as regular as for those in the frames. The glasses raised upon props must, however, be kept constantly over the centre as a shelter to the capital parts.

The bed requires to be hooped over for the support of mats in cold or wet weather. If paper-frames are employed, the most unremitting attention is required, the plants being very apt to spindle under them. They may, however, be employed with advantage in the place of mats for sheltering and shading. If the weather is at all unfavourable at the time the fruit is approaching maturity, it is highly advantageous to place hand-glasses over those that are growing exterior to the original one. The latest fruit seldom ripen even with the greatest care and attention, unless there are spare frames to inclose them entirely; those which do not, are employed in pickling.

For a tolerable supply throughout the season, a small family requires one three-light frame, and three hand-glasses; these together will yield on the average thirty or forty melons. The

largest establishment will not require more than four times as many.

MELON, WATER. The Water Melon is cultivated in the United States precisely like the Nutmeg. There are many kinds, of which the Mountain Sprout, Mountain Sweet, and Black Spanish are most esteemed at Philadelphia. The culture is so simple, and so generally understood, that direction must be needless. To produce fine Melons on heavy or wet soil, it is necessary to prepare a light rich compost in sufficient quantity to supply the wants of the vines—hills four or five feet in diameter, and two feet in depth.

MELON PUMPKIN. *Cucurbita melopepo.*

MELON THISTLE. *Melocactus.*

MELON TURK'S CAP. *Melocactus communis.*

MEMECYLON. Two species. Stove evergreen shrubs. Young cuttings. Sandy peat and loam.

MENIOCUS linifolius. Hardy annual. Seeds. Common soil.

MENISCIUM. Five species. Stove Ferns. Division or seeds. Loam and peat.

MENISPERMUM. Five species. Hardy deciduous or stove evergreen twiners. Division, cuttings, or seeds. Common soil.

MENONVILLEA filifolia. Hardy annual. Seeds. Light loamy soil.

MENTHA. Mint. Twenty-five species. Hardy herbaceous perennials. Division. Common soil.

Spear or Green Mint. M. viridis. Is employed in sauces and salads, as well as dried for soups in winter. There are two varieties, the broad and narrow leaved, equally good.

Penny Royal. M. Pulegium. Is cultivated for its use in culinary and pharmaceutical preparations. There are two varieties, the trailing, which is usually cultivated, and the upright.

Peppermint. M. piperita. For distilling, and the production of its peculiar oil and water.

Soil and Situation.—These plants are best grown on a tenacious soil; even a clay is more suitable to them, than a light silicious one. It should be moderately fertile, entirely free from stagnant moisture, and consequently on a dry subsoil or well drained. A wet soil makes them luxuriant in summer, but ensures decay in winter. A border

or situation that is sheltered from the meridian sun, is always to be allotted them, as in such they are most vigorous and constant in production. A compartment entirely secluded from the influence of the sun is, however, equally unfavourable with one that is too much exposed.

Time and Mode of Propagation.—They are propagated by parting the roots in February or March, September or October, and by slips or offsets at the same seasons. The mints likewise may be increased by cuttings of the annual shoots in May or June, as well as by cuttings of the roots in spring or autumn. For production of green tops throughout the winter and early spring, the spearmint is often planted in a hot-bed, and more rarely pennyroyal, every three weeks during October and three following months.

Planting in the open ground at whatever seasons, or by whatever mode, should if possible be performed in showery weather, or water must be given plentifully, especially to cuttings. If propagated by divisions of the root, they must be inserted in drills two inches deep; if by slips or cuttings, they must be five or six inches in length, and their lower half being divested of leaves, planted to that depth in every instance, being set in rows ten inches apart each way.

The only after cultivation required is the constant destruction of weeds, which are peculiarly injurious.

After July, the produce of green tops is of little value; they should therefore be allowed then to advance to flower, which they will produce towards the beginning of September, when they are in the fit state for gathering, either for drying or distilling. In either case the stalks should be cut just previously to the flower opening. At the close of September or beginning of October, the stems must be cut down as close as possible, the weeds cleared entirely away, and a little fine fresh mould spread over them. The beds should never be allowed to continue longer than four years; by constant gathering, the plants not only become weakened, but the roots becoming matted and greatly increased, produce only numerous diminutive shoots or entirely decay.

Forcing.—For forcing, a moderate hot-bed is necessary, earthed over about

three inches thick; in this the roots may be inserted about four inches apart, and one deep. They are sometimes only protected with mats, but frames are preferable. If it is inconvenient to construct a bed purposely, they may be planted in pots and plunged in any bed already in operation, or be set on the side of the stove. The temperature should never vary beyond the extremes of 70° and 80°.

MENTZELIA. Four species. Stove, green-house, and hardy perennials. *M. aspera*, a half-hardy annual. Cuttings. Sandy loam and peat.

MENZIESIA. Three species and many varieties. Hardy deciduous or evergreen shrubs. Layers. Sandy peat.

MERENDERA caucasica. Hardy bulbous perennial. Seeds or offsets. Light loam.

MERIANIA. Two species. Stove evergreen shrubs. Half-ripe cuttings. Sandy peat and loam.

MERODON narcissi. Narcissus Fly. Of this insect we have the following particulars by Mr. Curtis:—

“In the month of November, one or two large roundish holes are sometimes found on the outsides of the bulbs of the Daffodil, which are more or less decayed within, where a maggot will generally be found, which by feeding in the heart during the summer and autumn months, has been the sole author of the mischief.

“This larva is somewhat like the flesh-maggot, and not unlike a bot, only that it is not serrated with spines, and instead of being whitish, its natural colour, is changed to brown by its living amongst the slimy matter which has been discharged from its own body, causing the gradual rotting of the bulb.

“Towards the end of November, the maggot is transformed into a pupa, to accomplish which it eats its way out of the bulb near the roots, and buries itself in the surrounding earth. The pupæ are dull brown, elliptical, rough, and strongly wrinkled. In this state they remain until the following spring, when the flies issue from their tombs. Their eggs are then deposited, but upon what part of the plant they are laid, has not been observed, but probably upon the bulb near the base of the leaves. April seems to be the month when most of the flies hatch; and they have been compared to small humble-

bees, from the disposition of the colours, which are, for the most part, yellow, orange, and black, but they certainly bear a greater resemblance to some of the bots; from bees they are readily distinguished by having only two wings, the horns and proboscis are totally different, and they have no stings.

“Bulbs are affected by these maggots, and they are readily detected by their not throwing out leaves; when, therefore, a bulb fails to vegetate, it ought to be immediately dug up and destroyed.”—*Gard. Chron.*

MERTENSIA. Eight species. Hardy herbaceous perennials. Division. They thrive best in sandy peat.

MESEMBRYANTHEMUM. Three hundred and seventeen species, and many varieties. Chiefly green-house evergreen shrubs; many are trailing plants, some annuals and herbaceous perennials. *M. cristallinum* and *M. cultratum* are hardy. Cuttings. Sandy loam.

MESPILUS. Medlar. Two species and eight varieties. Hardy deciduous trees. *M. germanica stricta* is evergreen. Budding or grafting on the common hawthorn or pear, or seeds. Common soil. See *Medlar*.

MESSERSCHMIDIA. Four species. Stove evergreens. *M. hirsutissima*, a tree, the rest climbers. Cuttings. Loam and peat.

MESSUA ferrea. Stove evergreen tree. Seeds or cuttings. Strong loam, peat, and sand.

METALASIA. Four species. Green-house evergreen shrubs. Cuttings. Sandy peat and loam.

METEOROLOGY. See *Weather*.

METROSIDEROS. Six species. Green-house evergreen shrubs. *M. verus*, a stove evergreen tree. Cuttings. Loam, peat, and sand.

MEXICAN TIGER FLOWER. *Tigridia pavonia*.

MICE. Various plans have been suggested to preserve peas and beans, when sown, from the ravages of mice. We believe, we have tried them all. Dipping the seeds in oil, and then rolling them in powdered resin; putting small pieces of furze in the drills and over the rows after the seed has been sown, but before covering with the earth—were both partially successful, but the mode attended with the most complete safety, has always been that

of covering the surface of the soil over the rows, to the depth of full an inch, and six inches wide, with finely sifted coal ashes. The mice will not scratch through this, and it has the additional advantage, by its black colour absorbing the solar heat, of promoting the early vegetation of the crop.

MICHAELMAS DAISY. *Aster*.

MICHAUIA. Two species. Hardy biennials. Seeds. Rich loam.

MICHELIA *champaca*. Stove evergreen tree. Cuttings. Light loam.

MICONIA. Fourteen species. Stove evergreen shrubs. Cuttings. Loam and peat.

MICRANTHEMUM *orbiculatum*. Half-hardy evergreen trailer. Division. Sandy peat.

MICROCALA. Two species. Hardy annuals. Seeds. Common soil.

MICROLOMA. Two species. Greenhouse evergreen climbers. Cuttings. Loam and peat.

MICROMERIA. Eight species, and a few varieties. Chiefly half-hardy evergreen shrubs. Cuttings. Common soil.

MICROPERA. Two species. *M. banksii*, a green-house tuberous-rooted perennial. *M. pallida*, a stove orchid. Offsets. Rich mould.

MICROTIS. Three species. Half-hardy tuberous-rooted orchids. Division. Loam and peat.

MIDGE. See *Cecidomyia* and *Sciara*.

MIGNONETTE. *Reseda odorata*.

Soil.—Light loam, well drained, and manured with leaf-mould.

Sowing in the open ground from the end of April to the beginning of July will produce a sure succession of blooms through the year. If allowed to seed and the soil suits it, mignonette will continue to propagate itself. If not allowed to ripen its seed, the same plants will bloom for two or more seasons, being a perennial in its native country.

For Pot Culture and the production of flowers to succeed those of the open ground plants, sow once in August, and again in September. The soil as above, well drained and pressed into forty-eight pots: cover the seed a fourth of an inch. Thin the seedlings to three in a pot. Water sparingly. When mignonette is deficient of perfume, it is because the temperature is too low.

Tree mignonette.—Dr. Lindley says, "That this is obtained by selecting and potting a vigorous young plant, the

flowers of which are to be pinched off as often as they appear during the first season. It must be repotted as occasion may require; the lower shoots must be removed in autumn, and the plant must be kept during winter in a room or green-house above the freezing point. The second season it may be treated in a similar manner, and the next year it may be allowed to bloom, which, with care, it will continue to do for several years."—*Gard. Chron.*

MIKANIA. Five species. Stove evergreen twiners. Cuttings. Light rich soil.

MILDEW, whether on the stems of the wheat, or on the leaves of the chrysanthemum, pea, rose, or peach, appears in the form of minute fungi, the roots of which penetrate the pores of the epidermis, rob the plant of its juices, and interrupt its respiration. There seems to me every reason to believe that the fungus is communicated to the plants from the soil. Every specimen of these fungi emits annually myriads of minute seeds, and these are wafted over the soil by every wind, vegetating and reproducing seed, if they have happened to be deposited in a favourable place, or remaining until the following spring without germinating. These fungi have the power of spreading also by stooling or throwing out off-sets. They are never absent from a soil, and at some period of its growth are annually to be found upon the plants liable to their inroads. They are more observed in cold, damp, muggy seasons, because such seasons are peculiarly favourable to the growth of all fungi. The best of all cures is a weak solution of common salt and water sprinkled over the foliage of the plant affected by the aid of a painter's brush, or impelled by a syringe. Dissolve three ounces of the salt in each gallon of water, and repeat the application on two or three successive days, applying it during the evening. Nitre has been employed with similar success, using one ounce to each gallon. *Uredo rose*, *Puccinia rose*, and *Cladosporium herbarum*, are the mildew fungi of the rose tree: *Oidium crysiphoides* of the peach tree; and *Erysiphe communis* of the pea. Of course there are many others.

MILFOIL. *Achillea*.

MILLA. Two species. Half-hardy

bulbous perennials. Offsets. Sandy loam.

MILLINGTONIA simplicifolia. Stove evergreen tree. Cuttings. Peat and loam.

MILLIPEDE. See *Julus*.

MILTONIA. Three species. Stove orchids. Mr. Paxton says, "that to propagate them, the stems should be cut half through, young plants are then emitted; cut through the stem quite, a month before separating the young plants; plant in rough peat and pots—sheds."

MIMETES. Eight species. Green-house evergreen shrubs. Ripe cuttings. Light turfy loam.

MIMOSA. Twenty-two species. Chiefly stove evergreen shrubs. *M. pudica*, an annual. *M. viva*, an herbaceous perennial. Young cuttings. Loam, peat, and sand.

MIMULUS. Seventeen species. Chiefly hardy herbaceous perennials increased by division or seed. Common soil. The green-house and half-hardy species require a light rich soil, and increase by cuttings. The annuals, seeds. Common soil.

MIMUSOPS. Six species. Stove evergreen trees. Ripe cuttings. Light loamy soil, or loam and peat.

MINT. See *Mentha*.

MIRABILIS. Five species and several varieties. Green-house fusiform rooted perennials. Seeds. Light rich soil.

MERBELIA. Six species. Green-house evergreen shrubs. Young cuttings. Loam, peat, and sand.

MISLETOE (*Viscum album*) is sometimes required to be introduced upon the trees of the shrubbery, and other parts of the pleasure ground. The easiest and best way to propagate it is by placing ripe seeds on the smooth branches of the common apple, pear, or white thorn, in February or March, without in any way damaging the bark on which they are placed. The seeds should be fixed on the under side of the branch, as there they are shaded, and more likely to escape being eaten by birds when they begin to vegetate. Mistletoe may be grafted on the apple tree: but success is so precarious, that few succeed at present.—*Gard. Chron.*

MITCHELLA repens. Hardy herbaceous creeper; increased by cuttings of the stem. Peat, or peat and sand.

MITE. *Acarus*.

MITELLA. Five species. Hardy herbaceous perennials. Division. Peaty soil.

MITRASACME. Three species. *M. canescens*, a green-house herbaceous perennial; the other two annuals. Seeds. Sandy peat and loam.

MIXTURE OF SOILS is one of the most ready and cheapest modes of improving their staple, and thus rendering them more fertile; and upon the subject I have nothing to add to the following excellent remarks of my brother, Mr. Cuthbert Johnson:—

"I have witnessed even in soils to all appearance similar in composition, some very extraordinary results from their mere mixture. Thus in the gravelly soils of Spring Park, near Croydon, the ground is often excavated to a depth of many feet, through strata of barren gravel and red sand, for the purpose of obtaining the white or silver sand, which exists beneath them. When this fine sand is removed, the gravel and red sand is thrown back into the pit, the ground merely levelled, and then either let to cottagers for gardens, or planted with forest trees; in either case the effect is remarkable; all kinds of either fir or deciduous trees will now vegetate with remarkable luxuriance; and in the cottage garden thus formed, several species of vegetables, such as beans and potatoes, will produce very excellent crops, in the very soils in which they would have perished previous to their mixture. The permanent advantage of mixing soils, too, is not confined to merely those entirely of an earthy composition;—earths which contain inert organic matter, such as peat or moss earth, are highly valuable additions to some soils. Thus, peat earth was successfully added to the sandy soils of Merionethshire, by Sir Robert Vaughan. The Cheshire farmers add a mixture of moss and calcareous earth to their tight-bound earths, the effect of which they describe as having 'a loosening operation;' that is, it renders the soil of their strong clays less tenacious, and, consequently, promotes the ready access of the moisture and gases of the atmosphere to the roots. The cultivator sometimes deludes himself with the conclusion that applying sand, or marl, or clay, to a poor soil, merely

serves to freshen it for a time, and that the effects of such applications are apparent for only a limited period. Some comparative experiments, however, which were made sixteen years since, on some poor, hungry, inert heath land in Norfolk, have up to this time served to demonstrate the error of such a conclusion. In these experiments, the ground was marled with twenty cubic yards only per acre, and the same compost; it was then planted with a proper mixture of forest trees, and by the side of it, a portion of the heath, in a state of nature, was also planted with the same mixture of deciduous and fir trees.

"Sixteen years have annually served to demonstrate, by the luxuriance of the marled wood, the permanent effects produced by this mixture of soils. The growth of the trees has been there rapid and permanent; but on the adjoining soil, the trees have been stunted in their growth, miserable in appearance, and profitless to their owner.

"Another, but the least commonly practiced mode of improving the staple of a soil by earthy addition, is claying; a system of fertilizing, the good effects of which are much less immediately apparent than chalking, and hence one of the chief causes of its disuse. It requires some little time to elapse, and some stirring of the soil, before the clay is so well mixed with a sandy soil, as to produce that general increased attraction and retentive power for the atmospheric moisture, which ever constitutes the chief good result of claying poor soils. Clay must be moreover applied in rather larger proportions to the soil than chalk; for not only is its application rarely required as a direct food for plants for the mere alumina which it contains; since this earth enters into the composition of plants in very small proportion, but there is also another reason for a more liberal addition of clay being required, which is the impure state in which the alumina exists in what are commonly called clay soils."—*Farm. Encyc.*

MOERHINGIA. Two species. Hardy herbaceous perennials. Division. Sand, loam, and peat.

MOIST STOVE. See *Stove*.

MOLDAVIAN BALM. *Dracocephalum moldavicum*.

MOLE CRICKET. *Gryllus gryllo-*

talpa is known also in England as the churr-worm, jarr-worm, eve churr, and earth crab. It is, occasionally, very destructive to culinary vegetables; creeping under ground through holes it digs. It attains a length of two inches, is dark brown, and resembles in most respects the common cricket. Mr. Kollar thus describes its habits:—"The female hollows out a place for herself in the earth, about half a foot from the surface, in the month of June, and lays her eggs in a heap, which often contains from two to three hundred. They are shining yellowish brown, and of the size and shape of a grain of millet. This hollow place is of the shape of a bottle gourd, two inches long, and an inch deep, smooth within, and having on one side a winding communication with the surface of the earth. The young, which are hatched in July or August, greatly resemble black ants, and feed, like the old ones, on the tender roots of grass, corn, and various culinary vegetables. They betray their presence under the earth by the withered decay of culinary vegetables in the garden. In October and November they bury themselves deeper in the earth, as a protection from cold, and come again to the surface in the warmer days in March. Their presence is discovered by their throwing up the earth like moles.

"The surest and most efficacious of remedies is, without doubt, destroying the brood in June or July. Practised gardeners know from experience where the nest of the mole cricket is situated; they dig it out with their spades, and destroy hundreds in the egg state with little trouble."—*Kollar*.

MOLINERIA plicata. Stove herbaceous perennial. Division. Peat and loam.

MOLUCCA BALM. *Moluccella*.

MOLUCCELLA. Three species. Hardy annuals. *M. tuberosa*, a tuberous-rooted perennial. Seeds. Common soil.

MONACHANTHUS. *Monk's-flower*. Four species. Stove epiphytes. Division. Wood.

MONARDA. Seven species. Hardy herbaceous perennials. Division. Common soil.

MONETIA barlerioides. Stove evergreen shrub. Cuttings. Loam and peat.

MONEYWORT. *Dioscorea nummularia*.

MONEYWORT. *Lysimachia nummularia.*

MONEYWORT. *Taverniera nummularia.*

MONK'S FLOWER. *Monachanthus.*

MONK'S HOOD. *Aconitum.*

MONNINA obtusifolia. Green-house evergreen shrub. Cuttings or seed. Peat and loam.

MONOPSIS conspicua. Hardy annual. Seeds. Peat and Sand.

MONOSCHILUS gloxinifolia. Stove tuberous-rooted perennial. Division. Peat and loam.

MONOTAXIS simplex. Green-house evergreen shrub. Cuttings. Peat and loam.

MONOTOCA. Four species. Green-house evergreen shrubs. Cuttings. Sandy peat.

MONSONIA. Four species. Green-house herbaceous perennials. *M. ovata*, a biennial, is increased by seed; the others, cuttings or division. Turfy loam and leaf mould.

MONTEZUMA speciosissima. Stove evergreen tree. Half-ripened cuttings. Loam and peat.

MOON-SEED. *Menispermum.*

MOON-WORT. *Botrychium.*

MORÆA. Twenty species. Green-house bulbous perennials. Division. Sandy Peat.

MORENOA. Three species. Stove evergreen twiners. Cuttings. Peat and loam.

MORICANDIA arvensis. Hardy biennial. Seed. Common soil.

MORINA. Two species. Green-house or half-hardy herbaceous perennials. Seed. Light rich soil.

MORINDA. Five species. Stove evergreen shrubs. Cuttings. Loam and peat. *M. jasminoides* is a green-house evergreen climber.

MORISIA hypogæa. Hardy herbaceous perennial. Seed. Light loam.

MORISONIA americana. Stove evergreen tree. Ripe cuttings. Loam and peat.

MORMODES. Five species. Stove epiphytes. Division. Wood.

MORNA. Two species. Green-house annuals. Seeds. Sandy peat and leaf mould.

MORRENIA odorata. Green-house evergreen twiner. Cuttings. Rich mould.

MORUS. Mulberry. Nine species, and many varieties. Chiefly hardy de-

ciduous trees; a few are stove evergreens. Layers. A loamy soil and a moist situation. See *Mulberry*.

MOSCHARIA pinnatifida. Hardy annual. Seeds. Common soil.

MOSCHATEL. *Adoxa.*

MOSCHOSMA. Two species. Stove annuals. Seeds. Light rich soil.

MOSS is useful to the gardener for packing round the roots of plants; and even some bulbous roots have been cultivated in it; but when it infests the trunks of trees, or our lawns, it is one of the gardener's pests.

"Moss only attacks lawns, the soil of which is unable to support a greensward of grass. When soil is exhausted, grasses begin to die off, and their place is taken by moss. The obvious mode, then, of proceeding, is to give the lawn a good top-dressing in winter, either of malt-dust, or nitrate of soda, or soot, or any other manure containing an abundance of alkali. The gardener finds the growth of moss arrested by frequent raking in wet weather, or by the application of pounded oyster-shells; but these are mere palliatives, and not remedies. Make your grass healthy, and it will soon smother the moss."—*Gard. Chron.*

The most effectual, most salutary, and least disagreeable remedy for moss on trees is of trivial expense, and which a gardener need but try upon one individual to insure its adoption. It is with a hand scrubbing brush, dipped in a strong brine of common salt, as often as necessary to insure each portion of the bark being moistened with it, to scrub the trunks and branches of his trees at least every second year. It most effectually destroys insects of all kinds, and moss; and the stimulating influence of the application, and the friction, are productive of the most beneficial effects. The expense is not so much as that of dressing the trunks with a solution of lime, which, however efficient in the destruction of moss, is not so in the removal of insects—is highly injurious to the trees, by filling up the respiratory pores of the epidermis, and is decidedly a promoter of canker. On *gravel walks*, a strong solution of sulphate of copper (blue vitriol) has been found the most effectual destroyer of moss.

MOTH. *Verbascum Blattaria.*

MOTHERWORT. *Leonurus.*

MOTHS, of most kinds, are the parents of caterpillars preying upon some plant under the gardener's care, and should be destroyed whenever discovered.

MOULDINESS is the common term applied to that crop of fungi which appears on moist putrescent vegetable matters. These fungi are *Mucor*es, and are effectually destroyed whenever common salt or lime can be applied.

MOUNTAIN ASH. *Pyrus Aucuparia*.

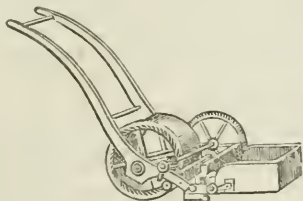
MOUSE TAIL. *Dendrobium Mysurus*.

MOUSE THORN. *Centaurea Myacantha*.

MOVING PLANT. *Desmodium gyrans*.

MOWING is, next to digging, the most laborious of the gardener's employments; and requires much practice, as well as an extremely sharp scythe, before he can attain to the art of shaving the lawn or grass plot smoothly and equally. A mowing machine has been invented by Mr. Budding and others, and is represented in this out-

Fig. 101.



line. It cuts, collects, and rolls the grass at the same time.

Mowing is most easily performed whilst the blades of grass are wet, as they then cling to the scythe, and are consequently erect against its cutting edge. The operation, therefore, should be performed early in the morning, before the dew has evaporated, or whilst the grass is wet from rain or artificial watering. See *Scythe*.

MUDDING or Puddling, is dipping the roots of trees, shrubs, and seedlings in a thin mud or puddle, and retaining them there until again planted, whenever they are removed. It is one of the best aids to success, and should be universally adopted, for it is a rule without exception, that the less the

roots of a plant are injured, and the moister they are kept during its removal, the less does it suffer by the transplanting. The best of all muds for the purpose is formed of three pounds of garden soil, one ounce of salt, eight ounces of soot, and one gallon of water.

MULBERRY. *Morus nigra*. The Black, or Garden Mulberry.

Soil and Site.—The soil most suitable for the mulberry is a rich, deep, and rather light loam, not cold nor wet, but well drained. It succeeds best as a standard, in a well-sheltered situation, open to the south. It may be trained also against a south wall with advantage in a cold climate, but requires much space.—*Gard. Chron.*

Propagation—by Seed—is rarely practised, the seedlings varying in quality, and being long before they bear fruit. Sow in a warm border, during March, in drills half an inch deep. Give moderate waterings in dry weather to the seedlings, and shelter by mats during cold nights. They require remaining two years in the seed bed, and then four in the nursery, before they are fit for final planting.

By Layers.—To obtain these in large quantities, some mulberry trees should be headed down near to the ground, to induce lateral shoots for layering.—Where only a few are wanted, pots of earth may be raised to the branches. See *Layering* and *Circumposition*.

Grafting and Budding—may be practised, taking any species of the genus *Morus* for the stock. Grafting is more difficult of success than budding, and Mr. Knight recommends grafting by approach as the only certain mode.

By Cuttings.—Mr. Knight recommends cuttings five inches in length, having two-thirds of their length two-year old wood, and one-third yearling wood, to be planted in November, beneath a south wall. In March, move them into pots, leaving only one bud uncovered, and plunge in a moderate hot-bed. Shade during bright weather, and success is almost unfailing. A more simple and expeditious mode is the following, but whether it is generally successful I am unable to state:—

“Lop off a straight branch, at least eight feet long, from a large tree, in March, the nearer the trunk the better;

clear away every little branch, and leave it quite bare; dig a hole four feet deep, plant the naked branch and make it firm in the ground; leave around it a little basin of earth to hold water, and if the season be dry, give it every morning a bucketfull of water throughout the summer. In two years it will have made a good head, and will bear fruit."—*Gard. Chron.*

Pruning.—Standards do not require pruning, further than to remove the dead wood and irregular growths. On walls and as espaliers train in all the lateral annual shoots, for near the ends of these next year is the fruit mostly produced, and pinch off all foreright unfruitful buds as they are produced. In training, always make the branches descend *below* the horizontal.

Forcing.—The mulberry bears forcing excellently, and will ripen its fruit early in June. It will bear a very high temperature. It may also be grown of a dwarf size in pots, and be thus forced.

MULCHING, is placing mulch, or long moist stable litter, upon the surface of the soil, over the roots of newly planted trees and shrubs. The best mode is to form a trench about six inches deep, to put in the mulch, and cover it with the earth. This prevents the mulch being dried or scattered by the winds, and is more neat than exposing it on the surface. Mulching keeps the moisture from evaporating, and prevents frost penetrating to the roots, straw being one of the worst conductors of heat.

MULE or Hybrid, is a plant raised from seed generated by parents of distinct species, and consequently unfertile. See *Hybridizing*.

MULLERA moniliformis. Stove evergreen tree. Young cuttings.—Loam and peat.

MULTIPLICATE FLOWER. See *Double Flower*.

MUNDIA spinosa, and its variety. Green-house and evergreen fruit shrubs. Young cuttings. Sandy peat.

MUNTINGIA calabura. Stove evergreen shrub. Cuttings. Light loamy soil.

MURALTIA. Fourteen species.—Green-house evergreen shrubs. Young cuttings. Sandy peat.

MURRAYA. Two species. Stove evergreens; one a shrub, the other a

tree. Ripe cuttings, with their leaves. Turfy loam and peat.

MURUCUYA. Two species. Stove evergreen climbers. Cuttings. Loam and peat.

MUSA. The Banana and Plantain belong to this genus, of which there are ten species. Stove herbaceous perennials. Suckers. Rich soil. The most valuable of the species is *M. cavendishii*; and upon its culture, and upon that of the whole genus, we have the following observations by Mr. W. Buchan, gardener at Blithfield:—

"To bring musas to a high state of perfection, they should be grown in a house entirely devoted to them. It may have a 'ridge and furrow' roof, nearly flat, and should be divided into pits about two feet six inches square, in order to grow the plants separately, so that when they have done fruiting, each may be removed and replaced without disturbing its neighbour. The stem of this musa seldom attains a greater height under the most favourable culture than six feet; and allowing two feet for the expansion of its foliage, a house ten feet high in front and twelve feet in the back, with sliding lights in the front and ends, would suit it admirably. But it may be easily fruited, and with good success, in a pit where there is sufficient height without crowding the leaves.

"The soil which suits all kinds of musa best is a mixture of half rotten dung and half sandy loam, with about one-fourth sandy peat, well mixed together. The pits or tubs, in which latter *M. cavendishii* may also be fruited, should be well drained, as the plant requires to be supplied liberally with water at the root when growing.

"They should never cease growing, and never be allowed to want heat and moisture from the time they are planted in the pit or tub, until the fruits have attained their full size. A strong moist heat, never below 75° or 80° Fahrenheit, should be constantly kept up; the plants frequently syringed over head, and exposed to full light, without any shade. This should be continued until the fruits are set and have attained their full size, taking care, however, not to wet the flowering plants. Young healthy plants will throw up their fruit in nine or ten months after being planted out, if treated as above; and

as soon as all the fertile flowers are set, the end of the spadix, an inch or two above the last tier of perfectly set fruit, should be cut off. When the upper tier of fruit on the spike begins to change colour, totally discontinue water, both at the root and over head."—*Gard. Chron.*

M. coccinea. The cultivation of this species is thus detailed by Mr. G. Watson, gardener at Norton Vicarage:—

"In the latter part of February, plant in pots five or six inches in diameter, well drained, and the drainage covered with a little moss. Plunge the pots into a bottom heat between 60° and 70°. Water freely, but give no more water than the plants can take up from the soil. As soon as the pot is filled with roots, shift the plant into a pot a size larger. After it has filled this pot with roots, a final shifting into a pot at least sixteen inches in diameter may be given, and two or three suckers may then be left on the plant, which will succeed the centre or principal plant in blooming. At this last shifting, pot as many suckers in the same way as may be required for succession plants. The plant is growing vigorously in this pot; cover the surface of the soil with moss, and place the pot in a shallow pan of water, and water it at least once or twice a day. I continue to keep the plant growing till November, after which I gradually get it into a dormant state, by withholding water during winter. It is allowed to remain dry till the soil separates from the edge of the pot, and may thus be kept in a cool green-house till spring. The suckers taken off at the last pottings, after being shifted into pots ten inches in diameter, and thrown into a dormant state at the same time as the old plant, will not only be much better wintered in the green-house, but will flower much earlier. In those parts where suckers are left on the mother plant, the centre will bloom by the beginning of May, and the suckers will flower in succession during the latter end of July and August, the latest flowers keeping fine till Christmas. Instead of taking off suckers in the spring, leave two or three on the mother plant till July, then take them off, and treat them in the same manner as the succession plants of the previous year."—*Gard. Chron.*

MUSCARI. Eleven species. Hardy

bulbous perennials. Offsets. Sandy loam.

MUSHROOM. *Agaricus campestris.* To produce mushrooms artificially, beds variously constructed are employed.

Times of forming the Beds.—Beds may be constructed from January until the beginning of May, for spring and summer production; and from July to the close of the year, for autumn and winter.

Construction.—A bed is usually constructed of stable dung, &c., prepared as already directed for cucumbers. It is made in the form of the roof of a house, four or five feet wide at the base, narrowing to an apex, which should be rather rounded, three or four feet high, and the length from ten to fifty feet. The dung being laid in alternate rows, with clayey loam, from which the largest stones have been sorted; each layer of dung to be a foot thick, and of loam four inches, so that three layers of each will be sufficient to complete the requisite height. The dung must be well separated and mixed, and beat, but not trod down. When completed, the bed must be covered with litter or other light covering, to keep out the wet, as well as to prevent its drying; clean dry straw will do, but sweet hay, or matting, is to be preferred.

Situation.—The bed should be made in a dry sheltered situation, and on the level ground in preference to founding it in a trench, which prevents the spawning being performed completely at the bottom, and guards against the settling of water, which may chill it. If the site is not dry, it must be covered with stones, clinkers, &c., to act as a drain; for nothing destroys mushrooms sooner than excessive moisture, except an extreme of heat or cold. To obviate the occurrence of these unfavourable circumstances, it is by far more preferable to construct it under a shed. If it is constructed in a shed, it may be built against one side, sloping downwards from it. To proceed with greater certainty during the winter, a fire flue may pass beneath the bed; but it is by no means absolutely necessary, for by the due regulation of covering, it may always be kept of sufficient temperature.

Management.—The spawn must not be inserted before the temperature has become moderate.

Temperature.—The minimum is 50°, and the maximum 65°. Insert the

spawn as soon as the violence of the heat has abated, which it will in two or three weeks, though sometimes it will subside in eight or ten days.

Spawning.—The large lumps of spawn, being broken into moderately small pieces, are to be planted on both sides of the bed and ends, if it is hip-ped; each fragment just beneath the surface of the dung, in rows six or eight inches apart each way. Some gardeners erroneously scatter the spawn irregularly over the surface. Fine rich loam, rather light than otherwise, is then to be put on, two inches deep, the stones being carefully separated. Some gardeners, endeavouring to imitate the natural mode of growth, spread an inch in depth of mould over the beds, in which they set the spawn, and gently cover it with half an inch more. Others lay a ledge of mould, four inches high, and two thick, all round the bed; upon this close to the dung, they lay the spawn; then a second ledge, six inches, of similar thickness, on this they set another row of spawn, and so proceed until the bed is finished; but this has no advantage over the first mode described, and is much more tedious. Lastly, a covering of straw, six or twelve inches thick, according to the temperature, is to be laid on, and continued constantly. When the earthing is finished, the surface must be gently smoothed with the back of the spade, which fixes it properly, and if in the open air throws off any excessive rain. If, after the bed has been spawned and covered up, the heat appears to be renewed in any considerable degree, the greatest part of the covering must be removed, but restored again during rain, if the bed is not under cover; and to guard against this contingency it is a good practice to mould over only two-thirds of the bed at first, leaving the top uncovered to serve as a vent for the heat and steam, but when all danger is passed it may then be completed.

Mr. Haukin, gardener to Capt. Nutford, thus completes his preparations:—"In about a week or ten days afterwards, I finish off the beds with green turf, one inch and a half in thickness, making the beds in my boxes, in all about nine inches in depth. I beat down the turf very firmly with the back of a spade; in finishing afterwards, I have no farther trouble except in paying at-

tention to the fire, and in admitting fresh air as it may be required. The house is heated by open tanks, which run through the centre of it, and which return again into the boiler, giving out a sufficient quantity of moisture for the necessary development and growth of the mushroom. During night, the grassy turf becomes copiously loaded with moisture; and should the following day prove fine, I never omit giving abundance of fresh air by the doorway. The temperature of the house ranges from 60° to 65° during the day, and at night it is frequently allowed to fall as low as temperate.

"The great advantage of growing the mushroom upon fresh grassy turf is obvious to any one accustomed to its cultivation. I have been in the habit of growing it, and with great success, upon coal refuse for the last two years; and at present I have two boxes at work, one covered with coal dust, the other with turf; the produce of these shows the relative advantage of the two methods, for although those from the coal dust are large and of good flavour, they are decidedly inferior in both respects to those produced by the grass covered beds; indeed, such is the superiority of the latter, that if the mushrooms from both beds were gathered, and mixed indiscriminately, any one could, without difficulty, select those grown upon the turf from those raised on the beds covered with the small coal."—*Gard. Chron.*

In four or five weeks after spawning, in spring and autumn, the bed should begin to produce, but not until much later in summer and winter; and if kept dry and warm, will continue to do so for several months.

A gathering may take place two or three times a week, according to the productiveness of the bed. It sometimes happens that beds will not come into production for five or six months; they should not therefore be impatiently destroyed.

Watering.—In autumn, the bed will not require water until the first crop is gathered, but it is then to be repeated after every gathering; a sprinkling only is necessary. In spring and summer, during dry weather, the same course is to be pursued. As excessive or unequal moisture is studiously to be avoided, the best mode of applying the

water is to pour it through a rose pan on to a thin layer of hay, which has previously been spread over the bed, and thus allowed to percolate by degrees. In winter, waterings are not allowable; to keep the mould moist, hot fermenting muleh may be put on outside the covering. If the bed is in the open ground, in a warm day succeeding to wet weather, it may be left uncovered for not more than two or three hours. During excessive rains, the additional covering of mats, &c., must be afforded; and on the other hand, if a moderate warm shower occurs during summer after excessive droughts, it may be fully admitted, by taking off the covering.

Mode of Gathering.—In gathering, the covering being carefully turned off, only such are to be taken as are half an inch or more in diameter before they become flat, but are compact and firm. Old mushrooms, especially, should be rejected for the table, as it is found that some which are innocuous when young, become dangerous when tending to decay; they also then lose much of their flavour.

Each individual is detached by a gentle twist completely to the root; a knife must never be employed, for the stumps left in the ground decay, and become the nursery of maggots, which are liable to infect the succeeding crop.

Other Modes of Cultivation.—Some gardeners merely vary from the preceding by building entirely of dung, without any layers of earth. Many gardeners grow mushrooms in the same bed with their melons and cucumbers. The spawn is inserted in the mould and on the hills of the beds, as soon as the burning heat is passed.

In September or October, when the bines of the plant decay, the bed is then carefully cleaned, the glasses put on and kept close, and when the mould becomes dry, water is frequently but moderately given, as well as every gentle shower admitted when necessary. A gentle heat is thus caused, and the produce is extraordinarily abundant, frequently two bushels, from a frame ten feet by six, and individuals have been produced two pounds in weight.

Mushrooms are thus produced without any trouble but the giving moderate waterings until frost prevents their vegetation; the glasses, if wanted, are then removed, and the beds covered

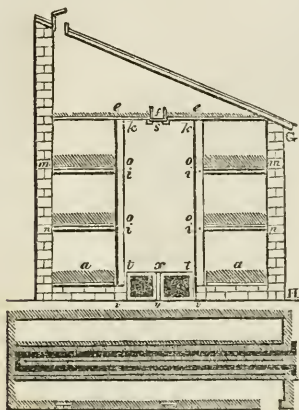
lightly with straw, but not otherwise. The warm showers of the ensuing spring will again cause an abundant production, as also in the autumn, if left; but the beds are generally broken up for the sake of the dung, and the spawn collected and dried.

Hampers or boxes containing about four inches depth of fresh, dry stable dung, or, in preference, of a mixture of three barrow loads of horse dung, and one perfectly dry cow dung, well pressed in, may be set in some situation, where neither damp nor frost can enter. After two or three days, or as soon as heat is generated, the spawn may be inserted, a mushroom brick to be broken into three equal parts, and each fragment to be laid four inches asunder, on the surface of the dung; after six days an inch and a half depth of fresh dung to be beaten down as before. In the course of a fortnight, or as soon as it is found that the spawn has run nearly through the whole of the dung, mould must be applied two inches and a half thick, and the surface made level. This mould must be prepared six months before wanted, by laying alternate layers, of six inches depth, of fresh stable dung, and three inches of light mould, to such an extent as may be deemed necessary for the supply of a year; in six months the dung will be sufficiently decayed, and the whole may then be broken together, and passed through a garden sieve for use. In five or six weeks the mushrooms will begin to come up, and if the mould appear dry, may then be gently watered; the water being slightly heated. Each box will continue in production six or eight weeks.

Mr. J. Oldaker, late gardener to the Emperor of Russia, introduced a house purposely constructed for the growth of the mushroom. The house is found of great use in storing brocoli during the winter. It is usually built against the back wall of a forcing house, as in the annexed plan, but if built unconnected with another building, the only necessary alteration is to have a hipped instead of a lean-to roof. The outside wall, G H, should be eight feet and a half high for four heights, the width ten feet within the walls, which is most convenient, as it admits shelves three feet and a half wide on each side, and a space up the middle three feet wide, for a double flue, and wall upon it.

When the outside of the house is finished, a floor or ceiling is made over it, as high as the top of the outside walls, of boards one inch thick, and plastered on the upper side, *ee*, with road sand, well wrought together, an inch thick; square trunks, *f*, being left in the ceiling nine inches in diameter, up the middle of the house, at six feet apart, with slides, *s*, to ventilate with when necessary.

Fig. 102.



Two single brick walls, *v v*, each five bricks high, are then to be erected at three feet and a half from the outside walls, to hold up the sides of the floor beds, *a a*, and form at the same time one side of the air flues. Upon these walls, *v v*, are to be laid planks four inches and a half wide and three inches thick, in which are to be mortised the standards, *l k*, which support the shelves. These standards to be three inches and a half square, and four feet and a half asunder, fastened at the top, *k k*, into the ceiling. The cross bearers, *i i*, *i i*, which support the shelves, *o o*, must be mortised into the bearers and into the walls; the first set of bearers being two feet from the floor, and each succeeding one to be at the same distance from the one below it. The shelves, *o o*, are to be of boards one inch and a half thick; each shelf having a ledge in front, of boards one inch thick, and eight inches deep, to support the front of the beds, fastened outside

the standards. The flue to commence at the end of the house next the door, and running the whole length to return back paralleled, and communicate with the chimney; the walls of the insides to be the height of four bricks laid flat, and six inches wide; this will allow a cavity, *t*, on each side betwixt the flues, two inches wide, to admit the heat from their sides into the house. The middle cavity, *x y*, should be covered with tiles, leaving a space of one inch betwixt each. The top of the flue, including the covering, should not be higher than the walls that form the fronts of the floor beds. The wall itself is covered with three rows of tiles, the centre one covering the cavity *x y*, as before mentioned, the outside cavities, *t t*, are left uncovered.

As the compost, the formation of the beds, &c., are very different from the common practice, I shall give a connected view of Mr. Oldaker's directions. The compost employed is fresh horse-dung, which has been subject neither to wet nor fermentation, cleared of the long straw, but one-fourth of the short litter allowed to remain, with one-fourth of dry turf mould, or other fresh earth: this enables the bed to be made solid and compact, which is so congenial to the growth of mushrooms.

The beds are to be made by placing a layer of the above compost, three inches thick, on the shelves and floor, which must be beat as close as possible with a flat mallet, fresh layers being added and consolidated until the bed is seven inches thick, and its surface as level as possible. If the beds are thicker, the fermentation caused will be too powerful; or, if much less, the heat will be insufficient for the nourishment of the spawn. As soon as the beds intimate a warmth of 80° or 90°, they are to be beat a second time to render them still more solid, and holes made with a dibble, three inches in diameter and nine apart, through the compost, in every part of the beds; these prevent too great a degree of heat arising and causing rottenness.

If the beds do not attain a proper heat in four or five days after being put together, another layer, two inches thick, must be added. If this does not increase the heat, part of the beds must be removed and fresh horse-droppings mixed with the remainder. The spawn

is to be inserted in three or four days after making the holes; when the thermometer indicates the desired degree of heat, the insides of the holes are dry; and while the heat is on a decline, every hole is to be filled, either with lumps or small fragments well beaten in, and the surface made level.

In a fortnight, if the spawn is vegetating freely, which it will if not damaged by excess of heat or moisture, and the beds are required for immediate production, they may be earthed over; but those for succession left unearthed, three or four weeks in summer, and four or five in winter. If the spawn is introduced in hot weather, air must be admitted as freely as possible until it has spread itself through the beds, otherwise these will become spongy, and the crop be neither good nor abundant.

The mould employed should be maiden earth, with turf well reduced; neither too dry nor too wet, otherwise it will not be capable of being beat solid. It must be laid regularly over the beds two inches thick. From the time of moulding, the room is to be kept at a temperature of 50° or 55°. If higher, it will weaken or destroy the spawn; if lower, it will vegetate slowly, and if watered in that state, numbers of mushrooms will be prevented attaining perfection. Water must be applied with extreme caution, being nearly as warm as new milk, and sprinkled over the beds with a syringe or small watering-pot. Cold water destroys both the crop and the beds. If suffered to become dry, it is better to give several light than one heavy watering.

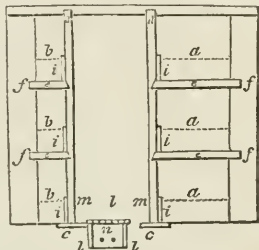
Beds thus managed will bear for several months; and a constant supply kept up by earthing one bed or more every two or three months.

If, when in full production, the mushrooms become long-stemmed and weak, the temperature is certainly too high, and air must be proportionately admitted. As the beds decline, to renovate them, the earth must be taken off clean, and if the dung is decayed they must be reformed, any good spawn being preserved that may appear; but if the beds are dry, solid, and full of good spawn, a fresh layer of compost, three or four inches thick, must be added, mixed a little with the old, and beat solid as before.

Mushrooms may be grown in a cellar, or other vaulted place, with equal success, and not unfrequently with a greater advantage, the same rules being adopted; but no fire is necessary, and less water.

Heating by Hot-Water.—Instead of flues, as used by Mr. Oldacker, the following plan, by Mr. Sellers, gardener to L. V. Watkins, Esq., of Pennoyre, may be substituted:—

Fig. 103.



"This cut represents a section of the interior of the house, with three beds for mushrooms, *a a a*, eighteen feet long, and three feet wide, and three shelves for forcing rhubarb, *b b b*. If circumstances permit, these shelves may be made wider, and used for mushrooms. Stones are placed on each side of the passage, at *c c*, for the standards to be placed on which support the bearers of the shelves, and mortised at *d d*. The stones should be about six inches square on the surface, and three inches thick; and the standards about three inches and a half square.

"When the standards and cross-bearers are fixed, the shelves may be formed by laying along the latter boards one inch and a half thick; and it will be convenient, when removing or putting fresh dung, if a board eight inches broad and one inch thick is placed behind the standard at *i i*, or cut so as to come flush with it.

"When the shelves are fixed, a trench, nine inches deep, is made in the passage, *m l m*, for the reception of the pipes; on each side this trench a brick-wall, *i i*, is built, to prevent rubbish from falling in. The bottom of the trench must be puddled with clay, so that the water thrown on the pipes will not escape.

"The pipes used are about one inch and a half bore, and they are laid in the trench three inches apart; a wooden trellis is placed over them, resting on the brick walls *i i*, and forms a path.

"When the mushrooms want steaming, it is only necessary to take a fine rose watering-pot, and sprinkle the pipes with it till the steam arises so thick that objects cannot be seen at the further end of the house. Steaming is better than watering over head for mushrooms, as much water is injurious to the spawn.—*Gard. Chron.*

Spawn, where to be found.—Spawn is constituted of masses of white fibres arising from the seeds of mushrooms that have fallen into situations suitable for their germination, from which it is to be obtained: such places are stable dung-hills, dungy horse-rides in stable-yards, horse mill-tracks, dry spongy composts: the droppings of hard-fed horses also produce it in greater abundance than the dung of any other animal; and more sparingly under sheds, where horses, oxen, or sheep have been kept. The dung of the two latter affords it in greater perfection than that of grass-fed horses. It has also been found in pigeons' dung; but the most certain mode of obtaining it is to open the ground about mushrooms growing in pastures, though it is said not to be so productive.

Time of Collecting.—It must be collected in July, August, and September, being reckoned in the greatest perfection in this last month. It may be found, however, and should be collected, when it appears in the spring. It generally occurs spread through the texture of cakes, or lumps of dry rotted dung. Put it in a heap under a dry shed; and a current of air, passing through the shed, is of great utility. If kept dry, spawn may be preserved three or four years: if damp, it will either vegetate before being planted, or putrefy.

Spawn must not be so far advanced in vegetation as to appear in threads or fibres; for, when in this state, it is no longer applicable to a mushroom-bed; it may produce a mushroom if left to itself, but otherwise is useless. Spawn proper for inserting in a bed should have the appearance of indistinct white mould.

May be raised.—Spawn is capable of

being raised artificially. The following is the manner:—

Two barrow-loads of cow-dung, not grass-fed, one load of sheep's-dung, and one of horses', well-dried and broken so small as to pass through a coarse sieve, are well mixed, and laid in a conical heap during March, in a dry shed, being well trod, as it is formed, to check its heating excessively. This heap is covered with hot dung, four inches thick, or only with mats if the shed is warm; for here, as in all the stages of growth, the heat should only range between 55° and 60°. In about a month the heap is examined; and if the spawn has not begun to run, which is shown by indistinct white fibres pervading its texture, another covering of equal thickness to the first is applied over the old one; in another month it will indubitably make its appearance. The time varies from three to ten weeks.

May be increased.—If a small quantity of spawn only can be collected, it may be increased by the following methods, the first of which is chiefly recommendable on account of its simplicity and facility of adoption:—

Small pieces of the spawn may be planted a foot asunder, just beneath the surface of the mould of a cucumber-bed constructed in the spring. In about two months the surface of the spawn will assume a mouldy appearance; it may then be taken up, with the earth adhering to it, and when dried stored as before directed.

The second mode is variously practised. In the course of May a heap of the droppings of cow, sheep, and horses, or any one or two of them, without the admixture of any undecomposed straw, is to be collected, and one-fifth of road-scrappings with one-twentieth of coal-ashes added, the whole being mixed together with as much of the drainings from a dung-hill as will make it of the consistency of mortar. Being well incorporated, it is then to be spread in a dry, sheltered, airy place, on a smooth surface, and beat flat with a spade. When become of the consistency of clay, it is to be cut into slabs about eight inches square, a hole punched half through the middle of each, and piled to dry, an opening being left between every two bricks. When perfectly dry, a fragment of the spawn is to be buried in the hole previously

made: it will shortly spread through the whole texture of the slabs, if kept in a warm dry place, when each may be broken into four pieces, and when quite dry laid on shelves—separate, and not in heaps, otherwise a bed will be formed for the spawn to run in. Mr. Wales recommends the composition to consist of three parts horse-dung without litter, two of rotten tree-leaves, two of cow-dung, one of rotten tanners' bark, and one of sheep's dung, mixed to the consistency of mortar, and moulded in small frames like those used by brick-makers, six inches long, four broad, and three deep. Three holes to be made half through the bricks, an inch apart, with a blunt dibble, for the reception of the spawn. They should be put on board for the convenience of moving abroad during fine days, as they must be made perfectly dry, which they often appear to be on the outside when they are far otherwise internally. Before they are perfectly dry they require great care in handling and turning, from their aptitude to break; but in about three weeks, if dry weather, when perfectly exsiccated, they become quite firm. To pervade them with the spawn, a layer of fresh horse-litter, which has laid in a heap to sweeten as for a hot-bed, must be formed, six inches thick, in a dry shed. On this a course of the bricks is to be laid, and their holes completely filled with spawn; and, as the bricks are laid in rows upon each other, the upper side of each is to be scattered over with some of the same. The bricks are not placed so as to touch, so that the heat and steam of the dung may circulate equally and freely. The heap is to terminate with a single brick, and when completed, covered with a layer, six inches thick, of hot dung, to be reinforced with an additional three inches after a lapse of two weeks. The spawn will generally have thoroughly run through the bricks after another fortnight. If, however, upon examination this is not found to be the case, they must remain for ten days longer. The bricks being allowed to dry for a few days before they are stored, will then keep for many years.

Mr. Oldaker recommends the bricks to be made of fresh horse-droppings, mixed with short litter, to which must be added one-third of cow-dung and a small portion of earth, to cement them

together. The spawn to be inserted when they are half dry.

Quantity required.—One bushel of spawn is required for a bed five feet by ten; two bushels for one double that length; and so on in proportion.

MUSK-FLOWER. *Mimulus moschata*.

MUSSEND. Eight species. Stove evergreen shrubs. Cuttings. Loam and peat.

MUSTARD. *Sinapis alba*.

Soil and Situation.—It succeeds best in a fine rich mouldy loam, in which the supply of moisture is regular; it may rather incline to lightness than tenacity. If grown for salading it need not be dug deep; but if for seed, to full the depth of the blade of the spade.

In early spring, and late in autumn, the situation should be sheltered; and during the height of summer, shaded from the meridian sun.

Time and Mode of Sowing.—For salading, it may be sown throughout the year. From the beginning of November to the same period of March, in a gentle hot-bed appropriated to the purpose, in one already employed for some other plant, or in the corner of a stove. From the close of February to the close of April it may be sown in the open ground, on a warm sheltered border, and from thence to the middle of September in a shady one. Both the white and black, for seed, may be sown at the close of March, in an open compartment. For salading, it is sown in flat-bottomed drills, about half an inch deep and six inches apart. The seed cannot well be sown too thick. The earth which covers the drills should be entirely divested of stones. Water must be given occasionally in dry weather, as a due supply of moisture is the chief inducement to a quick vegetation. The sowings are to be performed once or twice in a fortnight, according to the demand. Cress (*lepidium sativum*) is the almost constant accompaniment of this salad-herb; and as the mode of cultivation for each is identical, it is only necessary to remark that, as cress is rather tardier in vegetating than mustard, it is necessary, for the obtaining them both in perfection at the same time, to sow it five or six days earlier.

It must be cut for use whilst young, and before the rough leaves appear, otherwise the pungency of the flavour

is disagreeably increased. If the top only is cut off, the plants will in general shoot again, though this second produce is always scanty, and not so mild or tender.

To obtain Seed.—For the production of seed sow thin. When the seedlings have attained four leaves they should be hoed, and again after the lapse of a month, during dry weather, being set eight or nine inches apart. Throughout their growth they must be kept free from weeds; and if dry weather occurs at the time of flowering, water may be applied with great advantage to their roots.

The plants flower in June, and are fit for cutting when their pods have become devoid of verdure. They must be thoroughly dried before threshing and storing.

Forcing—For forcing, the seed is most conveniently sown in boxes or pans, even if a hot-bed is appropriated to the purpose. Pans of rotten tan are to be preferred to pots or boxes of mould; but whichever is employed the seed must be sown thick, and other restrictions attended to, as for the open-ground crops. The hot-bed need only be moderate. Air may be admitted as abundantly as circumstances will allow.

MUTISIA. Three species. Stove or green-house evergreen climbers. Cuttings. Peat and loam.

MYAGRUM *perfoliatum*. Hardy annuals. Seeds. Common soil.

MYANTHUS. Fly-wort. Four species. Stove epiphytes. Division. Wood.

MYGINDA. Five species. Stove evergreen shrubs, except *M. myrtifolia*, which is hardy. Ripe cuttings. Loam and peat.

MYLOCARYUM *ligustrinum*. Half-hardy evergreen shrub. Cuttings. Loam and peat.

MYOPORUM. Twelve species. Green-house evergreen shrubs. Cuttings. Loam and peat.

MYOSOTIS. Eleven species. Hardy annuals and aquatic and herbaceous perennials. *M. intermedia* is a deciduous trailer; *M. palustris* is the well-known Forget-me-not. The perennials require a moist soil, and may be increased by division or seed; the annuals by seed, in a dry sandy soil.

MYRCIA. Three species. Stove evergreen shrubs. Young cuttings. Loam, peat, and sand.

MYRIADENUS *tetraphyllus*. Stove biennial. Seeds. Common soil.

MYRICA. Eleven species. Green-house evergreen and hardy deciduous shrubs. The green-house kinds are increased by cuttings; the hardy by seeds or layers. Peaty soil.

MYRICARIA. Two species. Hardy evergreen shrubs. Cuttings. Common soil.

MYRISTICA. Nutmeg. Three species. Stove evergreen trees. Ripe cuttings. Sandy loam.

MYROBALAN PLUM. *Prunus domestica myrobalana*.

MYRSIPHYLLUM. Two species. Green-house deciduous twiners. Division. Sandy loam and peat.

MYRTLE. *Myrtus*.

MYRTLE-BILBERRY. *Vaccinium myrtillus*.

MYRTUS. The Myrtle. Eleven species, and many varieties. Green-house or stove evergreen shrubs. Half-ripened cuttings. Sandy loam and peat. Water freely whilst they are growing in spring and summer. The common myrtle is *M. communis*, of which there are several varieties, chiefly characterized by the breadth and size of the leaves or doubleness of the flowers.

Propagation.—By *Slips and Cuttings*.—The young shoots, either of the same or former year's growth, of from about two or three to five or six inches long, either slipped or cut off, are the proper parts for planting, and may be struck either with or without artificial heat. By either method June or July is the best season, especially when intended to use the shoots of the year. The previous year's shoots will also strike tolerably, especially if planted in spring, or, by aid of hot-beds, may be made to strike root readily at any time in the spring or summer. By aid of a hot-bed both one and two year shoots may be greatly facilitated in rooting. A dung hot-bed, under common frames and lights, will do, though a bark hot-bed of a stove, &c., is the most eligible and effectual. Plants thus struck in spring, or early in summer, from plants of the same year, will be fit to pot off separately early in autumn. Choose straight clean shoots, and as robust as possible, which divest of the lower leaves two-thirds of their length; they are then ready for planting. Fill the pots or pans with

light rich mould, in which plant the slips or cuttings—many in each pot or pan if required, putting them in within an inch of their tops, and about an inch or two asunder. Give directly some water, to settle the earth closely about each plant; then, either plunge the pots, &c., in a shallow garden-frame, and put on the glasses, or cover each pot or pan close with a low hand-glass, which is the most eligible for facilitating their rooting. In either method, however, observe to plunge the pots in the earth or hot-bed.

Afford them occasional shade from the mid-day sun, and give plenty of water three or four times a week at least, or oftener in very hot weather; thus they will be rooted in a month or six weeks. Let them remain in the open air until October, then remove them into the green-house for the winter; and in spring the forwardest in growth may be potted off separately in small pots; but if rather small and weak, or but indifferently rooted, let them have another summer's growth, and pot them out separately in September or spring following, managing them as other green-house shrubs of similar temperature, and shifting them into larger pots annually, or according as they shall require.

By Layers.—Such plants as are furnished with young bottom branches or shoots, situated low enough for laying, may be layered in spring in the usual way; every shoot will readily emit roots, and be fit to transplant into separate pots in autumn.

By Seed.—These may be sowed in spring, in pots of light mould, and plunged in a moderate hot-bed. The plants will soon come up, which, when two or three inches high, pot off separately in small pots: manage them as the others.—*Abercrombie*.

With respect to the general culture, see *Green-house Plants*.

NAILS for training wall trees are best made of cast iron, being the cheapest, stoutest, and most enduring. Before using they should be heated almost to redness, and then be thrown into cold linseed oil. When dry, they have a varnish upon them which preserves them from rusting, and prevents the mortar of the wall sticking to them so corrosively as it does if they are unoiled. In drawing old nails from

walls, the mortar is not so much disturbed if the nails are driven in a little further before they are extracted. Old nails may be renovated by being heated to redness, and then thrown into water: this removes from them the mortar; and then they may be again heated and put into oil as before directed. The cast iron nails used by gardeners are known to the ironmonger as wall nails, and are described as 2½, 3, 4, and 5 lb. wall nails, accordingly as 1,000 of them are of those weights.

“Nails in most cases require to be driven only a very little way into the mortar, and walls then do not become defaced by them for many years. In all summer nailing of peach trees, roses, &c., the point only requires to be driven in, so that the nail may be easily withdrawn by the fingers. If these precautions are attended to, and the nails are not driven into the face of the bricks, but between the mortar joints, a good wall will last for half a century without requiring fresh pointing, and by nails the branches of a tree can always be better placed than by loops or similar contrivance.”—*Gard. Chron.*

NANDINA domestica. Green-house evergreen shrub. Ripe cuttings. Loam and peat.

NAPOLEON'S WEEPING WILLOW. *Salix Napoleana*.

NARAVELIA zeylanica. Stove evergreen climber. Young cuttings. Sandy loam and peat.

NARCISSUS. Eighty-five species; all hardy bulbs, including the Daffodil (*N. Pseudo-Narcissus*); Two-coloured (*N. bicolor*); White, or Poet's Narcissus (*N. poeticus*); Hoop-petticoat Narcissus (*N. bulbocodium*); Small autumn Narcissus (*N. serotinus*); Polyanthus Narcissus (*N. tazetta*); Jonquil (*N. jonquilla*); and Paper Narcissus (*N. papyraceus*); with varieties of each.

Characteristics of Excellence.—Mr. Glenny says—“that in the Narcissi the flowers should be circular and large, they should expand flat, and the cup which is in the centre should stand out well. The petals should be thick, smooth, firm, free from notch or roughness on the edges, and have no points. The bunch of flowers should not consist of less than seven; the footstalks should be of such length as to allow the flowers to touch each other at the edge, and present an even, though

rounding or dome-like surface, with one bloom in the middle, the other six forming a circle round it. The stem should be strong, firm, elastic, and not more than ten inches in length. The leaves should be short, broad, and bright, and there must not be more than one flower stem to a show flower. If the variety be white, it should be pure; and the yellow cup should be bright. If the variety be yellow, it cannot be too bright. Double flowers, and Narcissi of numerous kinds, with only one or two flowers in a sheath, will not be considered subjects of exhibition, except in collections of forced flowers."—*Gard. and Prac. Flor.*

Propagation.—The propagation of all the Narcissi is effected principally by offsets; also by seed, to obtain new varieties.

By Offsets.—All the sorts increase plentifully by offset bulbs from the main roots annually; and the proper time for separating them is in summer, when they have done flowering, and the leaves and stalks begin to decay.

By Seed.—It will be often six or seven years before the seedlings will flower in perfection. The seed ripens in June or July, which sow soon after in pots or boxes of light rich earth, half an inch deep, then place them in a full sunny situation for the winter, allowing them shelter in severe frosts. In March or April they will come up. Give frequently sprinklings of water, and, occasional shade from the midday sun at their first appearance; and as the warm season advances, move the pots to an eastern aspect, to have only the morning sun till ten or eleven o'clock. In June or July the leaves will decay, when stir the surface lightly, and clear off the decayed leaves, all weeds, and mossiness; then sift a little fine mould over the surface, half an inch thick, repeating it in October. Let them remain till the third year, treating similarly; and in the third summer, at the decay of the leaves, take up the bulbs, and separate the largest, which plant in beds, in rows, five or six inches asunder and three deep; and the small bulbs you may scatter, mould and all, on the surface of another bed, and cover them two or three inches deep with fine earth, which after a year's growth may be transplanted in rows as above. In these beds let the seedlings

remain till they show flowers, and after the second year's bloom you will be able to judge of their properties, when mark the good sorts, and manage them as directed for the blowing roots.

Soil and Culture.—They succeed very well in any good, light, rich earth, in a sheltered situation and eastern aspect, with the beds a little elevated above the common level; and in winter and early in spring give occasional shelter of mats from frosts and inclement weather, especially after the flower buds appear above ground. All the sorts of these bulbs, planted in either of the above methods, may be suffered to remain in the ground two or three years, or more, unremoved; however, it is proper to take up the bulbs in general every third or fourth year, in order to separate the offsets, which in that time will be increased so greatly in number, that the tubes pressing close against one another, the inner ones will be so much compressed and weakened, as greatly to impede their flowering. But where these bulbs are intended for sale, they should generally be lifted once a year, or once every two years, otherwise, by their growing close in clusters, pressing against one another, they will be flattened thereby, and rendered unsightly, and less saleable. The proper time of year for taking up all the sorts is soon after they have done flowering, and their leaves and flower stalks attained a state of decay; at which time of lifting the bulbs, separate them all singly, and the smaller offsets from the larger, reserving the large roots for planting again in the principal compartments; and the smaller may be deposited in nursery beds for a year or two, to gain strength, when they will become good flowering roots, and may then be taken up at the proper season, in order for planting where wanted. When the roots are lifted at the above season, they may either be planted again directly, or in a month or six weeks after; or may be cleaned and dried, and retained out of the ground in a dry room, two or three months, or longer, if occasion shall require.

Method of Planting.—The best general season for planting all these bulbs is in autumn, from about the beginning or middle of September until November: they will flower considerably

stronger, as well as furnish a greater increase of offsets than those planted later, or not till spring; if, however, some roots are retained out of ground until February, they will succeed those of the autumnal planting in flowering. Those in the open borders should be deposited in little patches of about three or four roots in each, planting them either with a blunt dibble, or with a garden trowel, four inches deep. When planted in beds by themselves, have the beds four feet wide, with alleys, a foot and a half or two feet wide, between, plant the roots in rows lengthwise, nine inches asunder, about four inches deep, and six distant in each row, covering them regularly with the earth, and rake the surface smoothly. Having planted the roots in either of these methods, all the culture they require is to be kept clean from weeds; and they will all flower in the following spring and summer.

Water Culture.—The Polyanthus, Narcissus, and the large Jonquils, are bloomed in glasses of water in rooms, in winter and early in spring; any of the other species may also be flowered in the same manner; observing to procure such roots as were lifted at the season above mentioned. The season for placing in water is any time in winter or early spring, from October till March, observing to fill the glasses with fresh soft water, so full that the bottom of the bulb may just touch it. See *Hyacinth*.

Pot Culture.—The same plants may be brought to early bloom in pots; plant the bulbs in pots of light rich earth during August, and place in a warm room; they will bloom about November.—*Abercrombie*.

NARCISSUS-FLY. See *Meurodon*.

NASTURTIIUM. By this name are commonly known two species of *Tropaeolum*. *T. majus* is a hardy annual twiner, and there are several varieties, distinguished by their double or crimson flowers. *T. minus* is a hardy annual trailer, and a variety with double flowers, is a green-house evergreen.

Although strictly annual when grown in the open ground in this country, yet they are naturally perennial, as may be proved if they are grown in a greenhouse. The Major Nasturtium being the most productive, as well of flowers and leaves as of berries, is the one that

is usually cultivated in the kitchen garden; the first two being employed in salads and for garnishing, and the last in pickling.

Soil and Situation.—They flourish in almost any soil, but are most productive in a light fresh loam. In a strong rich soil, the plants are luxuriant, but afford fewer berries, and those of inferior flavour. They like an open situation.

Time and Mode of Sowing.—They may be sown from the beginning of March to the middle of May; the earlier, however, the better: one sowing in the kitchen garden, and that a small one, is quite sufficient for a moderate sized family. The seed may be inserted in a drill, two inches deep along its bottom, in a single row, with a space of two or three inches between every two, or they may be dibbled in at a similar distance and depth. The minor is likewise often sown in patches. The major should be inserted beneath a vacant paling, wall, or hedge, to which its stems may be trained, or in an open compartment, with sticks inserted on each side. The runners at first require a little attention to enable them to climb, but they soon are capable of doing so unassisted. The minor may either trail along the ground, or be supported with short sticks. If water is not afforded during dry weather, they will not shoot so vigorously, or be so productive. They flower from June until the close of October. The berries for pickling must be gathered when of full size, and whilst green and fleshy, during August.

To obtain Seed.—For the production of seed, some plants should be left ungathered from, as the first produced are not only the finest in general, but are often the only ones that ripen. They should be gathered as they ripen, which they do from the close of August even to the beginning of October. They must on no account be stored until perfectly dry and hard. The finest and soundest seed of the previous year's production should alone be sown; if it is older the plants are seldom vigorous.

NAUCLEA. Five species. Stove evergreen trees. Layers and cuttings. Rich loam.

NAVELWORT. *Cotyledon*.

NEAPOLITAN VIOLET. *Viola odorata pallida plena*. See *Violet*.

NECTARINE. *Persica lavis*.

Varieties.—The following are culti-

ivated in the Philadelphia Nurseries, and are among the better kinds:

EXPLANATION OF ABBREVIATIONS.—Color—y yellow; r red; o orange; g green; w white. Size—L large; M medium.

Those marked * are clingstones.

NAME.	COL'R	SIZE	QUAL	SEASON.
Downton	y r	L	1	September
Elruge	y r	L	1	August
*Golden	o	M	2	September
Peterborough	o g	M	2	September
*Red Roman	g r	L	1	September
*White Roman	w	L	1	August
White Early	w	L	1	August

For Culture, see *Peach*, which applies.

NECTAROSCORDUM *siculum*. Honey Garlic. Hardy bulb. Offsets. Common soil.

NEGRO-FLY. See *Athalia*.

NEGUNDO *fraxinifolium*. Two varieties. Hardy deciduous trees. Seed and layers. Light loam.

NELITRIS *jambosella*. Stove evergreen shrub. Cuttings and layers. Loam and peat.

NELUMBIUM. Five species. Stove aquatics. Seed and division. Rich loam in water. Mr. A. Scott, gardener to Sir G. Staunton, Bart., gives the following directions for cultivating *N. speciosum* :—

“Let it be kept dry during the winter, in a cool part of the plant stove, at about 50° Fahrenheit. In February, the roots to be divided and potted separately in turfy loam; the pots set in pans of water; the temperature of air from 65° to 90°; temperature of the water in the cisterns being about 75°. In May plant out in a water-tight box, three and a half feet long, one and a half foot wide, and sixteen inches deep, filled with loamy soil, having a little gravel on the top to give it solidity, and allowing room for about two inches of water over the surface of the soil. Plunge the box into the bark bed; the temperature of the soil and water in the box 80°. This bottom heat maintain during the summer, the temperature of the house varying from 65° to 90°.”—*Hort. Soc. Trans.* *N. luteum* is indigenous to the United States, though only found growing spontaneously in certain quarters. It has been introduced into the meadow ditches below

Philadelphia, where it thrives luxuriantly. We have seen it finely developed in artificial ponds, evincing that it is of easy culture.

NEMATANTHUS *chloronema*. Stove shrub. Cuttings. Light rich soil.

NEMESIA. Four species. Two hardy annuals, and the other green-house herbaceous perennials. The first increase by seed, the second by cuttings. Rich light loam.

NEMOPANTHES *canadensis*. Hardy deciduous shrub. Seed and layers. Peat.

NEMOPHILA. Six species. Hardy annuals and perennials. Seed. Peat and light soil.

NEOTTIA. Nineteen species. Hardy, green-house, and stove orchids. Division. Loam, peat, and chalk.

NEPENTHES. Two species. “Stove evergreen climbers. *N. distillatoria* is the Pitcher Plant. Offsets. Coarse peat and moss. Pots plunged in moss, kept moist and at 80°; air 70°.”—*Paxton's Bot. Dict.*

NEPETA. Thirty-five species. Hardy herbaceous, except *N. angustifolia*, which is annual. Seed and division. Light loam.

NERINE. Twelve species. Green-house bulbs. Seed and offsets. Rich light loam.

NERIUM. Oleander. Four species and more varieties. Green-house and stove evergreens. Cuttings. Rich light loam.

NESÆA *triflora*. Stove herbaceous. Cuttings. Sandy loam and peat.

NETTING is employed to prevent the radiation of heat from walls, and the rude access of wind to trees grown upon them, as well as to prevent the

ravages of birds upon currants, cherries, &c.

Netting is a very effectual preventive of cooling, for reasons which will be stated when considering *Shelters* generally; and in connection with that, it may be observed that it is not altogether immaterial of what substance netting is formed. Worsted is to be preferred not only because it is the most durable, but because it is the best preventive of a wall's cooling. I have found the thermometer under a hemp net sink during the night, from two to four degrees lower than that under a net of worsted, the meshes being small and of equal size in both nets. This can only be because worsted is known to be a worse conductor of heat than hemp; and, not absorbing moisture so easily, is not so liable to the cold always produced by its drying.—*Principles of Gardening*.

Netting will also exclude flies and other winged insects from the fruit against walls, although the meshes are more than large enough to permit their passage. Why this is the case is not very apparent, but the netting is equally efficient in keeping similar insects from intruding into rooms if there are no cross lights. If there are windows on different sides of the room, and it is to be presumed, therefore, also in a green or hot-house, nets would not be so efficient.

It is not a useless scrap of knowledge to the gardener, that one hundred square yards of netting, according to some merchants' mode of measuring, will not cover more than fifty square yards of wall, for they stretch the net first longitudinally and then laterally, when making *their* measurement, and not in both directions at once, as the gardener must when covering his trees. Disappointment, therefore, should be avoided, when ordering *new* nets, by stating the size of the surface which has to be covered. This may be done without any fear of imposition.

Mr. Richardson, net maker, New Road, London, informs me, that one cwt. of *old* mackerel net, weighed when quite dry, will cover eight hundred square yards; and one cwt. of *old* herring net (smaller meshes) will cover six hundred square yards. Mr. Hulme, of Knutsford, has sent me various specimens of his nets and open canvass for inspection—some made of woollen and

others of hemp: the last does not shrink after being wetted like the woollen. I prefer that with about twenty-five meshes in a square inch, at 5d. per square yard.

NETTLE TREE. *Celtis*.

NEUROLOMA *arabidiflorum*. Hardy herbaceous. Division. Common soil.

NEW JERSEY TEA. *Ceanothus Americanus*.

NEW ZEALAND SPINACH, *Tetragonia expansa*, is much admired as a substitute for summer spinach, being of more delicate flavor, and not so liable to run to seed. Mr. J. Anderson, gardener to the Earl of Essex, at Cassiobury, Herts, gives the following directions for its cultivation:—

"Sow in the seed-vessel as gathered the preceding autumn, at the latter end of March in a pot, and placed in a melon frame. The seedlings to be pricked while small singly into pots, to be kept under a frame without bottom heat, until the third week in May, or until the danger of frost is past. The bed for their reception is formed by digging a trench two feet wide and one deep, this being filled with thoroughly decayed dung, and covered six inches deep with mould. A space of at least three feet must be left vacant for the extension of the branches. Twenty plants will afford an abundant supply daily for a large family; they must be planted three feet apart.

"In dry seasons they probably require a large supply of water. In five or six weeks after planting, the young leaves may be gathered from them, these being pinched off. The leading shoot must be carefully preserved, for the branches are productive until a late period of the year, as they survive the frosts that kill nasturtiums and potatoes."

To obtain Seed.—For the production of seed, a plantation must be made on a poorer soil, or kept stunted and dry in pots, as ice plants are when seed is required of them. On the rich compost of the bed, the plants become so succulent as to prevent the production of seed. This vegetable has not proved, in the United States, worthy of its European reputation—probably owing to the intense heat of our summers.

NEW ZEALAND TEA. *Leptospermum scoparia*.

NICKER TREE. *Guilandina*.

NICOTIANA. Thirty-one species, in-

cluding *N. tabacum*, the well-known Tobacco. This and nearly all the others are hardy annuals. Seed. Rich light loam.

NIEREMBERGIA. Four species. Green-house herbaceous, except the hardy annual *N. aristata*. Seed or cuttings. Light loam.

NIGELLA. Fennel flower. Eleven species. Hardy annuals and biennials, except the herbaceous *N. coarctata*. Seed. Common soil.

NIGHTSHADE. *Solanum*.

NIGHT-SOIL. See *Dung*.

NIGHT TEMPERATURE in hot-houses and frames should always average from 10 to 20 degrees lower than the temperature in which the plants are grown during the day. It is in the night that the individual functions are renovated by a temporary repose, and if left to the dictates of healthy nature, the sap, like the blood, flows at night, with a much diminished velocity.

That plants do become exhausted by too unremitting excitement, is proved to every gardener who has peach-houses under his rule; for if the greatest care be not taken to ripen the wood by exposure to the air and light during the summer, no peach tree will be fruitful if forced during a second successive winter, but will require a much more increased temperature than at first to excite it even to any advance in vegetation.

The experiments of Harting and Munter upon vines growing in the open air, and those of Dr. Lindley upon vines in a hot-house, coincide in testifying that this tree grows most during the less light and cooler hours of the twenty-four. But the hours of total darkness were the period when the vine grew slowest. This, observes Dr. Lindley, seems to show the danger of employing a high night temperature, which forces such plants into growing fast at a time when nature bids them repose.

That the elevation of temperature at night does hurtfully excite plants is proved by the fact, that the branch of a vine kept at that period of the day in temperature not higher than 50°, inhales from one-sixteenth to one-tenth less oxygen than a similar branch of the same vine during the same night in a temperature of 75°. The exhalation of moisture and carbonic acid is propor-

tionably increased by the higher temperature.—*Principles of Gardening*.

NIPHOBOLUS. Eight species. Stove ferns. Seed and division. Sandy loam and peat.

NISSOLIA. Seven species. Stove evergreen climbers and shrubs. Cuttings. Loam and peat.

NITRATES. See *Saline Manures*.

NITTA TREE. *Parkia*.

NIVEA. Seven species. Green-house evergreen shrubs. Young cuttings. Sandy peat and loam.

NOCCA. Four species. Stove evergreen shrubs. *N. latifolia* is half-hardy. Cuttings. Common soil.

NOCTUA, a genus of moths. The following are injurious to our gardens:—

N. gamma. The Y, or Gamma Moth. The caterpillars of this are very destructive to peas and other kitchen vegetables during the summer. Mr. Curtis describes it as “being beset with greenish hairs, and on the back with yellow or white ones. It has a brown head. When fully grown, which takes place in the course of a few weeks, it forms a white cocoon, and changes into a blackish brown pupa.

“There are three or four generations of moths during the summer, which appear at intervals between April and October. In the latter month, we have seen them fluttering round flowers at dusk literally by thousands: this remark applies more particularly to the southern counties of England. The wings are about an inch across, the upper ones are varied with grey and brown, having quite a silvery hue, and towards the centre there is a perfect silvery Greek gamma, γ, with a rusty spot close before it, the lower wings are pale ashy brown, with the nerves and hinder margin deep brown. There are few remedies that can be applied to this pest; perhaps the best of all is hand-picking the caterpillars.—*Gard. Chron.*

N. exclamatoris. The caterpillar of this moth feeds on the stalks of the potato.

NOISETTIA longifolia. Stove evergreen shrub. Young cuttings. Light rich soil.

NOLANA. Five species. Hardy annual trailers. Seed. Common soil.

NOLINA georgiana. Hardy herbaceous. Offsets. Sandy peat.

NONATELIA. Four species. Stove

evergreen shrubs. Cuttings. Loam and peat.

NORANTEA. Two species. Stove evergreen shrubs. Cuttings. Loam and peat.

NORMANDY CRESS. See *American Cress*.

NORWAY SPRUCE. *Pinus canadensis*.

NOTELÆA. Five species. Greenhouse evergreen shrubs. Ripe cuttings. Peat and loam.

NOTHOCHLÆNA. Nine species. Greenhouse and stove ferns. Seed and division. Sandy peat.

NOTYLIA. Five species. Stove epiphytes. Offsets. Wood and moss.

NOVEMBER is a month chiefly of routine neatness and preparation for winter.

KITCHEN GARDEN.

Artichokes, winter, dress. — *Asparagus-beds*, dress; plant; to force; attend to that in forcing. — *Beet*, dig up for storing. — *Cabbages*, remove to winter quarters. — *Cardoons*, earth up, b. — *Carrots*, dig up and store, b. — *Cauliflowers*, attend to, under glasses, &c. — *Celery*, earth up. — *Coleworts*, plant. — *Composts*, prepare. — *Cucumbers*, attend to, in forcing. — *Drain* vacant ground. — *Dung*, prepare for hot-beds. — *Earthing-up*, attend to. — *Endive*, blanch, &c. — *Garlic*, plant, b. — *Herbary*, clean, &c. — *Horse-radish*, dig up and store. — *Hot-beds*, make for salading, &c. — *Jerusalem Artichokes*, dig up and store. — *Leaves*, &c., continually clear away. — *Lettuces*, plant in frames; attend to those advancing. — *Mint*, plant; force in hot-bed. — *Mushroom Beds*, make; attend to those in production. — *Onions*, in store, look over; plant for seed, b.; — *Parsley*, cut down, b. — *Parsnips*, dig up and store, b.; leave or plant out for seed. — *Potatoes*, dig up, b. — *Radishes*, sow, in hot-bed. — *Salsafy*, dig up and store. — *Savoy*s, plant for seed, b. — *Scorzonera*, dig up and store. — *Seeds*, dress and store. — *Shallots*, plant, b.; sow in hot-bed. — *Spinach*, thin, &c. — *Thinning*, attend to. — *Trench*, ridge, &c., vacant ground. — *Weeds*, destroy continually.

ORCHARD.

Apples, prune; plant. — *Apricots*, prune; plant. — *Berberries*, plant. — *Cherries*, prune; plant. — *Currants*,

prune; plant; cuttings plant. — *Figs*, rub off green fruit; train, but do not prune. — *Fork* over ground about fruit trees. — *Gooseberries*, plant; prune; cuttings, plant. — *Medlars*, plant. — *Mulberries*, plant. — *Mulch* round trees newly planted. — *Nectarines*, prune; plant. — *Nuts* (Filberts), &c., plant. — *Peaches*, prune; plant. — *Pears*, prune; plant. — *Plums*, prune; plant. — *Pruning* and planting generally should be done; it is the best season. — *Quinces*, plant. — *Raspberries*, prune; plant. — *Services*, plant. — *Stake* trees newly planted. — *Standards*, plant; prune. — *Stones* of fruit sow. — *Strawberries*, dress, if not done last month. — *Suckers*, remove. — *Trees* for forcing, remove. — *Trench* and manure ground to be planted, if not done months ago. — *Vines*, prune; plant. — *Wall Trees* and *Espaliers* generally, prune and plant; it is the best for their winter regulation. — *Walnuts*, plant. — *Water* all newly planted trees. — *Weeds*, destroy generally, and clean up.

FLOWER GARDEN.

Anemones, plant, if not done in October. — *Auriculas*, shelter. — *Bulbous* roots, finish planting in dry weather, b.; cover beds with mats, &c., in bad weather; pot for forcing. — *Carnation* layers, potted, shelter; finish planting. — *Climbers*, as *Ivy*, *Clematis*, &c., plant and train against walls. — *Composts*, prepare. — *Dahlias*, take up after the first frost; dry and store under sand, where the temperature keeps about 40°. — *Dressing* the borders is now the chief occupation. — *Edgings*, plant. — *Evergreens*, finish planting, b.; finish layering. — *Fibrous-rooted* plants, finish dividing and planting, b. — *Fork* over borders, shrubberies, &c. — *Grass*, roll; keep free from leaves. — *Gravel*, weed, sweep, and roll. — *Hedges*, plant, clip, plash. — *Hoeing* and raking are the chief operations. — *Hyacinths*, &c., place in water glasses; pot for forcing. — *Marvel of Peru*, take up and store. (See *Dahlia*.) — *Mulch* round shrubs lately planted. — *Leaves*, collect for composts. — *Plant* Perennials and Biennials. — *Planting* perform generally. — *Potted Shrubs*, plunge in the earth of a well sheltered border. — *Pot Plants* for forcing, as *Roses*, *Carnations*, &c. — *Prune Shrubs* generally. — *Ranunculuses*, plant, if not done in October. — *Seedlings*, in boxes,

remove to a warm situation.—*Shrubs* of all kinds, plant; stake them as a support against boisterous winds.—*Suckers* from Roses and other shrubs, separate and plant.—*Tulips*, finish main planting, b.—*Turf* may be laid.

HOT-HOUSE.

Air, admit as freely as the season allows.—*Bark Beds*, renew, if not done last month.—*Dress* the borders, by forking, &c.—*Fire Heat*, by whatever means it may be distributed, must now be daily employed.—*Manure* borders, &c., in which forcing trees are planted.—*Leaves*, clean with sponge, &c.; remove those decayed.—*Pines* will require the day temperature to be kept between 60° and 65°.—*Peaches*, prune; wash with diluted ammonia water from the gas works, before training; day temperature 50°.—*Potted* flowering plants, introduce.—*Steam*, admit into the house, where that mode of heating is used.—*Strawberries*, begin to force.—*Tobacco* fumigations employ to destroy insects.—*Trees*, in forcing, treat like the Peach.—*Water* (tepid), apply with the syringe to the leaves; give to their roots, occasionally; keep in pans about the house.

GREEN-HOUSE.

Air, admit freely, when mild.—*Chrysanthemums* require abundant watering.—*Damp* stagnant air is more to be dreaded than cold.—*Decayed* parts, remove, as they appear.—*Earth*, in pots stir frequently.—*Fires* must be lighted, if frost severe, or heavy cold fogs occur.—*Leaves*, clean with sponge, &c.—*Temperature*, keep at about 45°, but not higher.—*Water* moderately.

NUPHAR. Five species. Hardy aquatics. Division and seed; ponds, cisterns, &c.

NURSERY is a garden or portion of a garden devoted to the rearing of trees and shrubs during their early stages of growth, before they are of a size desired for the fruit or pleasure grounds. As every tenant of the nursery is separately discussed in these pages, no more is required here than to make a few general observations.

Extent, Soil, Situation, &c.—With respect to the proper extent of a nursery, whether for private use, or for public supply, it must be according to the quantity of plants required, or the demand for sale; if for private use, from

a quarter or half an acre to five or six acres may be proper, which must be regulated according to the extent of garden ground and plantations it is required to supply with the various sorts of plants, and if for a public nursery, not less than three or four acres of land will be worth occupying as such, and from that to fifteen or twenty acres, or more, may be requisite according to the demand, though some occupy forty or fifty acres in nursery ground. A nursery may be of any moderately light land, that is fifteen or eighteen inches depth of good working staple; but if two or three spades deep, it will be the greater advantage. A good fresh fat soil, such as any good pasture, which having the sward trenched to the bottom is excellent for the growth of trees, a rich soil fit for corn is also extremely proper, or any other good soil of the nature of common garden earth is also very well adapted for a nursery. As to situation; if this is rather low it will be better, because it is naturally warmer, and more out of the power of cutting and boisterous winds than a higher situation, though if it happens where some parts of the ground are high and some low, it is an advantage, the better suiting the nature of the different plants. It is also of advantage to have a nursery ground fully exposed to the sun and air, and where there is the convenience of having water, for the occasional watering.

Mode of Arranging the Plants.—In the distribution of the various sorts of plants in the nursery, let each sort be separate, in lines or nursery rows, to stand till arrived at a proper growth for drawing off for the garden and plantations, placing the fruit trees, stocks, &c., for grafting and budding upon, in rows two feet asunder, and half that distance in the rows, varying the distance both ways, according to the time they are to stand; the shrub kind should likewise be arranged in rows about two feet asunder, and fifteen or eighteen inches distant in each line; and as to herbaceous plants, they should generally be disposed in four feet wide beds, in rows from six to twelve or eighteen inches asunder, according to their nature of growth, and time they are to stand.

General Culture.—Those designed as stocks for fruit-trees should have their

stems generally cleared from lateral shoots, but never to shorten the leading shoot unless it is decayed or becomes very crooked, in which case it may be proper to cut it down low in spring, and it will shoot out again—training the main shoot for a stem, with its top entire, for the present, till grafted or budded.

Forest trees should also be encouraged to form straight clean stems by occasional trimming of the largest lateral branches, which will also promote the leading top shoot in aspiring farther in height, always suffering that part of each tree to shoot at full length, unless where the stem divides into forks—in which case trim off the weakest, and leave the straightest and strongest shoot or branch to shoot out at its proper length, to form the top.

The different sorts of shrubs may either be suffered to branch out in their own natural way, except just regulating very irregular growths, or some may be trained with single clean stems, from about a foot to two or three feet high.

Every winter or spring the ground between the rows of all transplanted plants, in the open nursery-quarters, must be dug: this is particularly necessary to all the tree and shrub kind that stand wide enough in rows to admit the spade between; which work is, by the nurserymen, called turning-in, the most general season for which work is any time from October until March. But the sooner it is done the more advantageous it will prove to the plants.

The ground is to be dug but half spade deep, proceeding row by row, turning the top of each spit clean to the bottom, that all weeds on the surface may be buried a proper depth to rot.

In summer be remarkably attentive to keep all clean from weeds. The seedlings growing close in the seminary-beds must be hand-weeded; but to all plants that grow in rows introduce the hoe. As any quarter or compartment of the nursery-ground is cleared from plants, others must be substituted in their room from the seminary; but the ground should previously be trenched and lie some time fallow, giving it also the addition of manure if it shall seem proper.

It will be of advantage to plant the ground with plants of a different kind from those which occupied it before. The tender or exotic plants of all kinds

require shelter only from frost whilst young, and by degrees become hardy enough to live in the open air. Such of them as are seedlings, in the open grounds, should be arched over with hoops or rods at the approach of winter, in order to be sheltered with mats in severe weather; and those which are in pots, either seedlings or transplanted plants, should be removed in October, in their pots, to a warm sunny place, sometimes sheltered with hedges, &c., placing some close under the fences, facing the sun, where they may have occasional covering, either of glass lights or mats, &c., from frost, observing of all those sorts here alluded to that they are gradually to be hardened to the open ground, and need only be covered in frosty weather. At all other times let them remain fully exposed, and by degrees, as they acquire age and strength, inure them to bear the open air fully, so that, when they arrive at from two or three to four or five years old, they may be turned out in the open ground.—*Abercrombie*.

NUTMEG. *Myristica*.

NUTTALIA. Five species. Hardy herbaceous. Seed and division. Sandy peat.

NUT-TREE. *Corylus*. See *Filbert*.

NYCTANTHES *arborescens*. Stove evergreen shrub. Cuttings. Loam and peat.

NYMPHÆA. Water-lily. Eighteen species. Hardy and stove aquatics. Seed or division. Rich loam in water.

NYSSA. Four species. Hardy deciduous trees. Seed and layers. Common soil in a moist situation.

OAK. *Quercus*.

OBESIA. Three species. Greenhouse evergreen shrubs. Young cuttings. Sandy loam.

OCHINA. Seven species. Stove evergreen shrubs, except the greenhouse *O. atropurpurea*. Cuttings. Sandy loam and peat.

OCHROSIA *borbonica*. Stove evergreen shrub. Cuttings. Rich light loam.

OCHRUS *pallida*. Hardy annual climber. Seed. Common soil.

OCTOBER is one of the gardener's harvest months in the southern section of the Union; in the middle and northern states, his out-door labours are drawing to a close.

KITCHEN-GARDEN.

Angelica, sow. — *Asparagus* - beds, dress, e.; for forcing, plant. — *Balm*, plant. — *Beet* take up for storing, e.; *Borecole*, plant, b.; earth up, &c. — *Burnet*, plant. — *Cabbages*, prick out, &c.; plant for seed. — *Cardoons*, earth up. — *Carrots*, take up to store. — *Cauliflowers*, prick out in frames. — *Celery*, earth up. — *Chives*, plant. — *Coleworts*, plant. — *Cress* (Water), plant. — *Cucumbers*, plant to force. — *Dill*, sow. — *Dung*, prepare for hot-beds. — *Earthing-up*, attend to. — *Endive*, attend to; blanch, &c. — *Fennel*, plant. — *Garlic*, plant, e. — *Herbary*, dress. — *Horse-Radish*, plant. — *Hyssop*, plant. — *Jerusalem Artichokes*, stir, e. — *Leaves*, fallen, remove continually. — *Leeks*, plant, b.; hoe, &c., advancing crops. — *Lettuces*, prick out, e. — *Mint*, plant. — *Mushroom-beds*, make; attend to those in production. — *Nasturtium Berries*, gather as they ripen. — *Onions*, attend to those in store, plant for seed. — *Parsley*, cut down, b.; (Hamburgh), is fit for use. — *Parsnips*, take up for storing, e.; leave or plant out for seed. — *Pennyroyal*, plant. — *Potatoes*, dig up, e. — *Rhubarb*, sow. — *Rosemary*, plant. — *Rue*, plant. — *Sage*, plant. — *Satsafy* is in perfection; take up for storing. — *Savory*, plant. — *Savoys*, plant for seed. — *Scorzonera* is in perfection; take up for storing. — *Seeds*, gather as they ripen. — *Shallots*, plant, e. — *Small Salading*, sow. — *Spinach*, thin, &c. — *Stir* between rows of plants. — *Tansy*, plant. — *Taragon*, plant. — *Thinning*, attend to. — *Thyme*, plant. — *Turnips*, plant for seed; hoe young crops. — *Vacant ground*, trench, drain, &c.

ORCHARD.

Berberries, gather. — *Chestnuts*, gather. — *Currants* and *Gooseberries*, plant; prune; cuttings plant. — *Fig Trees*, protect when leaves are off. — *Fruit Trees*, for forcing, plant in pots or in hot-house. — *Gathering* apples and pears, finish. — *Grapes*, ripe, gather and hang up, e.; bag on the vines. — *Layers* of figs, filberts, mulberries, vines, &c., make; those of last year take up and plant. — *Medlars*, gather, e. — *Planting* may begin generally, e. — *Pruning*, commence, e. — *Quinces*, gather, e. — *Raspberries*, prune and plant, if leaves have fallen. — *Ridge* up ground after pruning is finished. — *Servises*, gather, e. — *Stones* of cherries and plums, sow. — *Strawber-*

ries, dress; plant. — *Trench* and prepare ground for planting. — *Wall-fruit* and *espaliers* generally, begin to prune, e. — *Walnuts*, gather. — *Water*, give abundantly at the time of planting.

FLOWER GARDEN.

Anemones, plant. — *Annuals*, done flowering, pull up; sow hardy, b. — *Auriculas*, move to sunny shelter; protect from rain and snow; remove dead leaves; slip. — *Bulbous roots*, plant; those in flower protect; place in water glasses. — *Carnation layers*, plant in pots, e. — *Chrysanthemum* cuttings, finish planting. — *Climbers*, plant. — *Compost*, prepare. — *Cuttings*, plant. — *Dahlias*, protect in flower; begin to take up roots to dry and store as the leaves decay, e. — *Edgings*, trim. — *Evergreens*, plant; trim. — *Fibrous-rooted* plants, transplant where required; divide roots. — *Grass*, mow and roll. — *Gravel*, weed and roll. — *Green-house* plants, remove from borders to the house. — *Hedges*, trim; plant; plash. — *Hoe and Rake*, as required. — *Layers*, make; they will have to remain twelve months. — *Leaves*, gather as they fall, and store for composts. — *Mignonette*, shelter. — *Pipings* of Pinks, &c., finish planting to remain. — *Planting*, generally, may be done. — *Potting*, perform as required; dress old potted plants. — *Primulas*, all this genus (*Polyanthus*, &c.) may be propagated by slips. — *Prune*, generally. — *Ranunculuses*, plant. — *Seedlings*, shelter. — *Seeds*, finish gathering. — *Suckers*, remove and plant out. — *Trench* vacant ground. — *Tuberous-rooted* plants insert, especially *Pæonies*. — *Turf* may be laid.

HOT-HOUSE.

Air, admit freely every fine day. — *Bark-beds*, renovate in fruiting stoves and succession house. — *Fires* must begin to be lighted where the old flue system is followed, e. — *Flowering Shrubs* in pots, introduce for winter blooming. — *Glass, Flues*, &c., repair, if not done last month. — *Pines*, remove into fruiting stoves, b.; *Crowns* plant, if required. — *Roses*, introduce for Christmas blooming. — *Shifting* into larger pots may be done. — *Water* about twice weekly.

GREEN-HOUSE.

Air, give freely daily, and at night, if temp. not so low as 35°. — *Camellias*, bud. — *Earth*, give fresh before return-

ing into house.—*Leaves* clean, and dress plants before returning to house.—*Potted Plants*, return all into house, e.; place hardiest back, and tenderest in front.—*Succulent Plants* should all be in, b.—*Water*, give over the foliage after the plants are in house; give water once or twice weekly.

OCYUM. Basil. Thirteen species. Chiefly hardy annuals, but some are stove evergreen shrubs. See *Basil*.

ODONTARRHENA *microphylla*. Hardy evergreen trailer. Cuttings. Loam and peat.

ODONTOGLOSSUM. Eight species. Stove epiphytes. Division. Wood and moss.

OECEOLADES. Two species. Stove epiphytes. Lateral shoots. Wood and moss.

ODERA *prolifera*. Green-house evergreen shrub. Cuttings. Sandy loam and peat.

ENOTHERA. Evening Primrose. Seventeen species. Hardy annuals, biennials and perennials, except the green-house evergreen shrub (*E. cheiranthifolia*). Seed; and the perennials also by division. Common light soil.

SELECT SHOWY SPECIES.

Perennials.

- Æ. Speciosa, white.
- Æ. Macrocarpa, yellow.
- Æ. Taraxacifolia, white.
- Æ. Glauca, yellow.
- Æ. Serotina, yellow.

Annuals.

- Æ. Rubicunda, pink.
- Æ. Lindleyana, purplish-rose.
- Æ. Tenuifolia, purple.
- Æ. Tetraptera, white.
- Æ. Odorata, yellow.
- Æ. Romanzovii, blue.

Enothera Drummondii, is a fine large yellow sort, and very ornamental, but it is tender, and requires the same treatment as petunias and verbenas.—*Gard. Chron.*

Æ. *serotina*, is a beautiful autumn flower, and its culture is thus recommended:—"The bed should be looked over every morning, and the flowers of the previous day carried off. This will very considerably add to its beauty. Where a quantity of it is wanted for bedding, May is the fit time to attend to its propagation, by preparing cuttings (as soon as the young wood has

advanced to the length of one and a half or two inches), pricking them out in sand, in the open ground, and covering them with a hand-glass. If treated in this manner, the whole of the cuttings may be expected to root, and be ready for planting out in a month; whereas, if deferred until the autumn, when the increase of flower-garden stock is considered *en masse*, the probability is that not one will succeed."—*Gard. Chron.*

This mode of culture is applicable to all the perennial species.

OFFSETS are side bulbs produced by some bulbous roots, and by which the species can be propagated. Whatever checks the upward growth of the parent plant, as an early breaking down of the stem, compels the sap to find other organs for its reception, and, consequently, promotes the production of offsets. "The practice," says Dr. Lindley, "of scarring the centre of bulbs, the heads of echino cacti, and such plants, and the crown of the stem of species like *Littæa geminiflora*, in all which cases suckers are the result, is explicable upon the foregoing principle."

OGECHÆ LIME. *Nyssa candicans*.

OIL NUT. *Hamillonia*.

OKRA. "The Okra is a native of the West Indies, where it is much used in soups and stews; its use is rapidly increasing here. There are two varieties, the large and the small podded or capsuled.

"The seeds are planted late in spring, either in rows or hills, three feet apart; the plant thrives readily, and requires no further care than is requisite to keep it free from weeds."—*Rural Reg.*

OLAX. Two species. Stove, evergreen climbers. Cuttings. Loam and peat.

OLD-MAN'S-BEARD. *Geropogon*.

OLEA. The Olive. Green-house and stove evergreen trees, except *O. sativa*, which is hardy. Ripe cuttings, and grafting on the Common Privet (*Ligustrum vulgare*). Loam and peat.

OLEANDER. *Nerium*.

OLEASTER. *Elaëagnus*.

OLIBANUM. *Boswellia*.

OLIVE. *Olea*.

OLIVE-WOOD. *Elæodendron*.

OLYNTIIA *disticha*. Stove evergreen tree. Young cuttings. Sandy loam and peat.

OMALANTHUS *populifolia*. Stove evergreen shrub. Ripe cuttings. Peat and loam.

OMIME PLANT. *Plectranthus ternatus*.

OMPHALOBIMUM. Two species. Stove evergreen shrubs. Ripe cuttings. Light loam and peat.

OMPHALADES. Eight species. Hardy annuals and herbaceous perennials; the first being increased by seed in open borders; the second by division, in shaded situations.

ONCIDIUM. Fifty-nine species. Stove epiphytes. Shoots, moss, and rotten wood.

ONE-SHIFT SYSTEM in potting, is thus described by Mr. Ayres:—"The distinguishing difference of this system is, that instead of taking a plant through all the different-sized pots, from a thumb to a twenty-four or sixteen, or any other size that it may remain in permanently, it is removed to the permanent pot at once, or at any rate to one very considerably larger than is the general custom; thus in purchasing small specimens of new plants, they may be placed at once in a twenty-four, sixteen, or twelve-sized pot, in which they will remain for four or five years.

"The principal thing to attend to in this system will be to have the pots thoroughly drained; for if water stagnates in such a mass of soil, all hope of success will be at end. In growing specimen plants, it is a good plan to drain the soil with an inverted pot, taking great care to prevent the soil from falling among the drainage by covering it securely with moss. Porous stones of various sizes, in considerable quantities, sticks in a half-decomposed state, and even charcoal for some plants, have been used with satisfactory results.

"Another very important point to be attended to in this system of potting is, to use the soil as rough as possible. Plants potted in this way will not require so much attention as those potted in the usual manner; because one watering will serve them for several days, whereas in small pots they would require constant attention."—*Gardener's Chron.*

There is no doubt that this system much abridges the gardener's labour, and there is an equal certainty that by

it large specimens may be rapidly obtained; but as, with due care, magnificent specimens may be grown in small pots, annually increased in size when the plants are shifted, the general adoption of the one-shift system will never be general, accompanied as it is by such a great sacrifice of space in the stove and green-house.

ONION. "The Onion is a biennial plant, supposed to be a native of Spain. The varieties are numerous. Those esteemed the best, are the SILVER SKIN, and LARGE YELLOW STRASBURGH; the latter is the best keeper, though perhaps not so delicately flavoured as the Silver Skin.

"The WETHERSFIELD red is grown extensively in the eastern states, where it perfects itself the first season.

"It is the practice with the market gardeners of Philadelphia, who grow the Strasburgh and Silver Skin, to the exclusion of all others, to sow the seed thickly in beds in the middle of spring. At midsummer they are taken up, and placed in a dry airy situation, until the succeeding spring, when they are replanted; in this way they get large, firm, well keeping Onions early in the season. It should be observed that if not sown quite thickly they attain too large a size, and when replanted shoot to seed. When sown early, and very thinly, on strong ground, bulbs large enough for family use, may be had the first season; they do not, however, usually attain a size large enough for the market. When sown in this way, they should be frequently hoed, and kept perfectly clean; and the Wethersfield is perhaps the best."—*Rural Reg.*

To save Seed.—To obtain seed, some old onions must be planted in autumn or early in Spring. The finest and firmest bulbs being selected and planted in rows ten inches apart each way, either in drills or by a blunt-ended dibble, the soil to be rather poorer, if it differs at all from that in which they are cultivated for bulbing. They must be buried so deep, that the mould just covers the crown. Early in Spring their leaves will appear. If grown in large quantities, a path must be left two feet wide between every three or four rows to allow the necessary cultivation. They must be kept thoroughly clear from weeds, and when in flower have stakes driven at intervals of five or six feet on

each side of every two rows, to which a string is to be fastened throughout the whole length, a few inches below the heads, to serve as a support and prevent their being broken down. The seeds are ripe in August, which is intimated by the husks becoming brownish; the heads must then be immediately cut, otherwise the receptacles will open and shed their contents. Being spread on cloths in the sun, and during inclement weather they soon become perfectly dry, when the seed may be rubbed out, cleaned of the chaff, and, after remaining another day or two, finally stored. It is of the utmost consequence to employ seed of not more than two years old, otherwise not more than one in fifty will vegetate. The goodness of seed may be easily discovered by forcing a little of it in a hot-bed or warm water a day before it is employed; a small white point will soon protrude if it is fertile.

ONION-FLY. See *Anthomyia* and *Eumerus*.

ONISCUS. *O. asellus*, *O. armadillo*. Woodlice.

The first is most easily distinguished from the second by its not rolling up in a globular form when at rest. They are found in old dry dunghills, cucumber frames, &c., and they are injurious to many plants, fruits, &c., by gnawing off the outer skin. Gas lime will expel them from their haunts, and two boards or tiles kept one-eighth of an inch apart form an excellent trap.—*Gard. Chron.*

ONOBROMA. Five species. *O. glaucum* is a hardy annual, and *O. arborescens*, a green-house shrub, the others hardy herbaceous. Seed, cuttings, or divisions. Common soil.

ONOBRYCHIS. Saintfoin. Twenty-three species. Hardy herbaceous. Seed. Chalky loam.

ONOCLEA. Two species. Hardy herbaceous. Seed and division. Sandy loam and peat.

ONONIS. Thirty-seven species. Mostly hardy annuals and shrubby plants. Seed or cuttings. Loam.

ONOSMA. Sixteen species. Hardy herbaceous, except the stove *O. trinervium*. Seed. Rich chalky loam.

ONOSMODIUM. Two species. Hardy herbaceous. Seed. Rich light loam.

OPHIPOGON. Three species.

Half-hardy herbaceous. Division. Sandy loam and peat.

OPHIOXYLON *serpentinum*. Stove evergreen shrub. Cuttings. Sandy loam and peat.

OPHRYS. Ten species. Hardy and half-hardy orchids. Seed. Chalky loam and peat.

OPLOTHECA. Two species.

O. florodana is hardy herbaceous, increased by division. *O. interrupta* is a stove biennial, by seed. Both require loam and peat.

OPUNTIA. Eighty-seven species. Stove cacti, except *O. fragilis* and *O. missouriensis*, which are hardy; and the half-hardies, *O. media*, *O. polyacantha*, and *O. vulgaris*. Slips, slightly dried; sandy peat.

ORACH, *Atriplex hortensis*, is cooked and eaten in the same manner as spinach, to which it is much preferred by many persons, although it belongs to a tribe whose wholesomeness is very suspicious.

Soil and Situation.—It flourishes best in a rich moist soil, and in an open compartment. Those, however, of the autumn sowing require a rather drier soil.

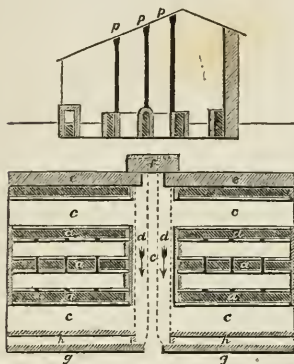
Sowing.—It may be sown about the end of September, and again in the spring for succession. The sowing to be performed in drills six inches apart. The plants soon make their appearance, being of quick growth. When they are about an inch high, they must be thinned to six inches asunder, and those removed may be planted out at the same distance in a similar situation, and watered occasionally until established. At the time of thinning, the bed must be thoroughly cleared of weeds, and if they are again hoed during a dry day, when the plants are about four inches high, they will require no further attendance than an occasional weeding. For early production, a sowing may be in a moderate hot-bed at the same time as those in the natural ground. The leaves must be gathered for use whilst young, otherwise they become stringy and worthless.

To save Seed.—Some plants of the spring sowing must be left ungathered from, and thinned to about eight inches apart. The seeds ripen about the end of August, when the plants must be pulled up, and when perfectly dry rubbed out for use.

ORANGE. *Citrus aurantium*. See *Citrus*.

ORANGERY is a green-house or conservatory devoted to the cultivation of the genus *Citrus*. The best plan for the construction of such a building is that erected at Knowsley Park, and thus described by the gardener, Mr. J. W. Jones.

Fig. 104.



"Measured inside, this house is fourteen and a half yards long, eight broad, and six high. In the centre of the house are eight borders, in which the oranges, &c., are planted; these borders are all marked *a*. The two borders against the back wall are sixteen inches broad, and three feet deep. The six borders immediately in the centre of the house are fourteen inches broad, and three feet deep; the paths are marked *c*, the front wall *d*, and the back one *e*; *p, p, p*, represent ornamental cast iron pillars, which, besides supporting the roof, serve also to support light wire trellises; there is one of these pillars in each row for each rafter. The house is entirely heated by smoke flues, two furnaces being placed at *f*. The dotted lines along the central path show the direction of the flues beneath, from the back to the front entrance, when they diverge, the one entering a raised flue, *g*, on the right, the other also entering a raised flue on the left. These flues again cross the house at each end, and the smoke escapes by the back wall; it being found inconvenient to place the furnaces in any other situation.

"Two stoves immediately connected with each end of the orangery contain the collection of tropical plants bearing fruit. The communication between these stoves and the orangery is uninterrupted by any glass or other division, so that the orange tribe are subjected to nearly as high a temperature as the tropical plants. The central borders of the orangery, as may be seen in the section, are raised a little above each other, as they recede from the front of the house. The oranges, citrons, &c., are all trained as espaliers; a light wire trellis being stretched from pillar to pillar parallel with the borders, and about eight feet high. The spaces, *b*, between the borders being about three feet wide, permit a person to walk along between the plants, for the purpose of pruning, watering, &c. These spaces are of the same depth as the borders, and were originally filled with tan; but part of this is now removed, and its place is filled with good soil. In this some fine climbing plants have been turned out, amongst which are several plants of *Passiflora quadrangularis*, which bear an abundant crop of fine fruit. Besides these, there are also two fine plants of the beautiful new *Gardenia Sherbournia*. These, and other climbers, are trained up the rafters, &c., in such a manner as not to materially intercept the light from the orange. The great advantage of having the trees trained on the trellis system is, that every part of the tree is fully exposed to the light, and by planting them in rows one behind the other, a larger surface is obtained for the trees to cover than could be got by adopting any other plan; and consequently, for the space, a larger quantity of fruit is procured. The trees being hung loosely and irregularly to the wires, assume as natural an appearance as circumstances will permit, and the introduction here and there of large plants in pots has a tendency to prevent formality. Two plants are placed in each border."—*Gard. Chron.*

ORBEA. Twenty-three species. Stove evergreen shrubs. Cuttings slightly dried; sandy loam and lime rubbish.

ORCHARD is an inclosure devoted to the cultivation of hardy fruit trees. In it may be, as standards, apple-trees, most sorts of pears and plums, and all sorts of cherries, which four are the

chief orchard fruits; but to have a complete orchard, also quinces, medlars, mulberries, service trees, filberts, nuts, berberries, walnuts, and chestnuts must be included. The two latter are particularly applicable for the boundaries of orchards, to screen the other trees from impetuous winds. A general orchard composed of all the before mentioned fruit trees, should consist of a double portion of apple trees. With respect to the situation and aspect for an orchard, avoid very low damp situations as much as the nature of the place will admit: for in very wet soils no fruit trees will prosper, nor the fruit be fine; but a moderately low situation, free from copious wet, may be more eligible than an elevated ground, as being less exposed to tempestuous winds; though a situation having a small declivity is very desirable, especially if its aspect incline towards the east, south-east, or south, which are rather more eligible than a westerly aspect; but a north aspect is the worst of all for an orchard, unless particularly compensated by the peculiar temperament or good quality of the soil. Any common field or pasture that produces good crops of corn, grass, or kitchen garden vegetables, is suitable for an orchard; if it should prove of a loamy nature, it will be a particular advantage; any soil, however, of a good quality, not too light and dry, or too heavy, stubborn, or wet, but of a medium nature, friable and open, with not less than one spade deep of good staple, will be proper.

Preparation of the Ground.—The preparation of the ground for the reception of the trees is by trenching one or two spades, as the soil will admit. And if in grass, turn the sward clean to the bottom of each trench, which will prove an excellent manure. The ground must be fenced securely against cattle, &c., either with a good ditch and hedge, or with a paling fence, as may be most convenient.

Method of Planting the Trees.—The season for planting all the sorts of fruit trees is autumn, soon after the fall of the leaf, from about the latter end of October until December, though it may be performed any time in open weather, from October until March or April; on light land the autumn is usually preferred, on heavy land the spring is best.

Let several varieties of each particular species be chosen that ripen their fruit at different times from the earliest to the latest, according to the nature of the different sorts, that there may be a sufficient supply of every sort during their proper season; and of apples and pears, in particular, choose a much greater quantity of the autumnal and late ripening kinds, than the early sorts; but most of all of apples; for the summer ripening fruit is but of short duration, only proper for temporary service; but the latter ripening kinds keep sound some considerable time for autumn and winter use. The arrangement of the trees in the orchard must be in rows, each kind separate, at distances according to the nature of growth of the different sorts; but for the larger growing kinds, such as apples, pears, plums, cherries, &c., they should stand from twenty-five to thirty or forty feet every way asunder, though twenty-five or thirty feet at most is a reasonable distance for all these kinds. Each species and its varieties should generally be in rows by themselves, the better to suit their respective modes of growth. Stake the new planted trees, to support them in their proper position, and secure them from being rocked to and fro by the wind, which would greatly retard their rooting afresh, placing two or three strong tall stakes to each tree; but the most effectual method is to have three stakes to each, placed in a triangle, meeting at top near the head of the tree, wrapping a hayband round that part of the stem, to prevent its being barked by the stakes or tying; then tie the stakes at top close to the tree with some proper bandage, bringing it close about the stem and stakes together, over the hay wrapping, so as to secure the tree firmly in an erect posture. If laid down in grass no cattle should be turned in to graze at large, unless the stem of each tree is previously well secured with posts and railing, or wattled with thorn bushes, especially in young orchards, otherwise they will bark the trees; nor should large cattle be turned into orchards, where the branches of the trees are yet low and within their reach.—*Abercrombie. See Tree-Guard.*

ORCHIDEOUS PLANTS are chiefly herbaceous, a very few are even semi-frutescent; but all are characterized

either by singular beauty or fragrance; and, as many of them are extremely impatient of cultivation, they have of late years obtained great attention from horticulturists; and pre-eminent among these, are Dr. Lindley, Mr. Lodiges, Mr. Bateman, Mr. Paxton, Mr. Catley, Mr. Clowes, &c.

Eria.
Dendrobium.
Anisopetalum.
Cælogyne.
Malaxis.
Microstylis.
Liparis.

Calypso.
Pleurothallis.
Stanhopea.
Stelis.
Cypripedium.
Saccolabium.

GENERA.

Goodyera.	Corycium.
Thelymitra.	Calanthe.
Diuris.	Octomeria.
Orthoceras.	Maxillaria.
Cryptostylis.	Camaridium.
Ponthieva.	Ornithidium.
Prasophyllum.	Pholidota.
Calochilus.	Megaclinium.
Neottia.	Ornithocephalus.
Pelexia.	Cryptarrhena.
Listera.	Aerides.
Stenorhynchus.	Vanda.
Arethusa.	Sarcanthus.
Calopogon.	Aeranthus.
Pogonia.	Angræcum.
Microtis.	Ionopsis.
Acianthus.	Renanthera.
Cyrtostylis.	Cymbidium.
Chiloglottis.	Cirrheæ.
Eriochilus.	Lissochilus.
Caladenia.	Sarcochilus.
Lyperanthus.	Geodorum.
Glossodia.	Dipodium.
Pterostylis.	Oncidium.
Epipactis.	Macradenia.
Cephalanthera.	Brassia.
Corallorhiza.	Cyrtopodium.
Caleya.	Zygopetalum.
Corysanthes.	Catasetum.
Prescotia.	Anguloa.
Gastrodia.	Ceratochilus.
Vanilla.	Encyclia.
Orchis.	Heterotaxis.
Glossula.	Eulophia.
Anacamptis.	Xylobium.
Nigritella.	Polystachya.
Aceras.	Gongora.
Ophrys.	Trizeuxis.
Serapias.	Rodriguezia.
Disa.	Sophranitis.
Habenaria.	Fernandesia.
Gymnadenia.	Tribrachia.
Platanthera.	Gomeza.
Chamorchis.	Notylia.
Herminium.	Bletia.
Bartholina.	Brassavola.
Bonatea.	Epidendrum.
Satyrrium.	Cattleya.
Pterogodium.	Broughtonia.
Disperis.	Isochilus.

Tender Orchideous Plants.—Dr. Lindley has given the following selections from the foregoing, with statements as to their appropriate modes of growth:—

“To grow orchidaceous plants in the highest state of perfection, several houses would be requisite; for example, there should be a cool house for those which inhabit the high lands of Mexico and Guatemala; a warm and moist one for others which grow in the hot damp valleys of India, and other parts of the tropics; a third, kept warm and dry, for containing those which are in a state of rest; and a fourth for plants in flower. But, however beautiful and interesting this tribe may be, few persons would go to this expense; and many have succeeded admirably in growing a selection mixed with other stove plants. It is difficult to give directions for the management of a house of this kind without seeing it, but the following should be attended to. Keep the orchidaceous plants as much together as possible, either at one side, or along the front itself. This is necessary in order that they may be kept more moist or shaded than the other plants. If the house fronts the south, shade will be indispensable during bright sunshine in summer and autumn. The temperature of it during the dull months of winter, that is from November to February, should not exceed 60° by night. As the spring advances, raise it to 65° and 70°, and it may be kept at that as long as artificial heat is necessary. If the summer and autumn are warm, no fire will be required for two or three months. Always allow the temperature to sink several degrees lower at night than during the day. If this is done, and the stove kept damp enough, the plants will be covered with dew in the morning. The following is a list of those most suitable.

“1. To be grown in pots and placed near the warmest end of the stove. *Dendrobium nobile*, one of the most lovely yet known. *Oncidium papilio*, an interesting kind, having flowers like

a butterfly. *Peristeria elata*, the beautiful dove flower. *Miltonia candida*, *Cattleya labiata*, *C. Mossiae*, *C. crispa*, *C. intermedia*, *C. Harrisoniata*: these flower in great profusion during summer, and are remarkable for their great beauty. *Cymbidium sinense*, with dingy coloured flowers, but very fragrant. *Zygopetalum Mackaili*, *Z. intermedium*, *Z. crinitum*, very showy and sweet-scented. *Brassia caudata*, *B. Lanceana*, and *B. maculata*. *Acanthaphippium bicolor* is easily cultivated, and produces a nest of flowers in spring. *Gongora atropurpurea* likes heat and moisture, the flowers are striking and curious.

"2. To be grown in pots and placed in the coolest end of the stove. *Oncidium Cavendishianum* produces large spikes of yellow flower. *Cattleya Skinneri*, *Epidendrum Stamfordianum*, whose flowers hang very gracefully, and the violet markings of them are delicate and beautiful. *Trichopilia tortilis* with finely spotted flowers. *Catasetum maculatum*, and *Phasius grandifolius*, which should be kept near the light, and is very thirsty while growing. *Maxillaria aromatica* and *M. cruenta* have fine yellow flowers, highly fragrant. *M. tenuifolia* has pretty spotted flowers. *Cyrtorchilium maculatum*, and several varieties of it, are well worth cultivation.

"3. To be suspended in baskets, or on blocks of wood near the warmest end. *Dendrobium cucullatum*, *maculatum*, and *fimbriatum*, the former with rose coloured, the latter with pretty yellow fringed flowers. *Oncidium amplexatum*, large varieties; *O. Lanceanum*, one of the best of the genus, will also do well in a pot. *Aerides odoratum*, very sweet; *Saccolabium guttatum*; both of these want a very warm and moist situation, but their beautiful rose and lilac blossoms will repay any trouble.

"4. To be suspended in baskets, or blocks of wood near the coolest end of the stove. *Laelia autumnalis*, *L. albida*, and *L. anceps*, are very ornamental, resembling *Cattleyas*. *Oncidium leucochilum* is easily grown, and the delicate white of the lip contrasts well with the brown markings of the other parts of the flower. *Odontoglossum grande*, whose flowers are very large and particularly striking. *Stanhopea tigrina* and several other species send their

flowers downwards in the same direction as the roots, and have a very curious appearance."—*Gard. Chron.*

Hardy Orchideous Plants.—M. F. Otto has written as follows upon these:—

"The best time for transplanting Orchises is early in autumn, when the plants are in a state of rest, and the cultivator must devise the means of finding them, although they are almost withered upon the ground.

"They grow much better if placed between other plants, as they find themselves in their natural situation.

"They should be brought into the garden not only with the whole of their ball of earth, but also with all the sorts of plants belonging to it. They never thrive so well as if they stood among the other plants which naturally surround them.

"Experience has taught that the greater part of the Swiss and Tyrolese Alpine Orchises, as well as those from the south of Europe, are cultivated in pots, but in this situation the plants weaken from year to year, until the tubercles at last disappear. If we would retain them longer in our gardens, particular attention must be paid to the soil in which they grow, and it would probably be best to cultivate them in boxes, which may be covered during the winter months.

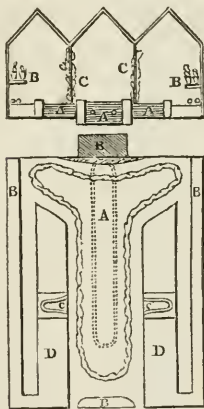
"It may be useful to those who would collect the northern species into gardens, to know the situation and soil in which they naturally grow.

"*Mataxis paludosa* upon very wet peat earth, among sphagnum. *Coralorrhiza innata* upon stumps of roots in wooded peaty marshes. *Liparis Locselii*, in peat meadows, among sphagnum. *Orchis morio*, in meadows and pastures. *O. palustris*, in damp meadows, often half under water. *O. maculata*, in meadows and pastures. *O. pallens*, upon chalk, in mountain pastures. *O. militans*, in meadows. *O. fusca*, upon chalk, in mountain meadows. *O. coriophora*, in meadows. *O. ustulata*, in meadows. *O. globosa*, in meadows. *O. sambucina*, in meadows. *O. maculata*, in very dry meadows. *O. latifolia*, in meadows. *O. anacamptis pyramidalis*, in meadows. *O. gynadenia conopsea*, in meadows. *O. condensiflora*, in meadows. *O. platanthera bifolia*, in dry meadows, on mountains, and in forests. *O. hermin-*

ium monarchis, in meadows. *Ophrys myodes*, in shady forests, particularly upon chalk. *O. arachnites*, in meadows, also upon limestone. *O. apifera*, upon limestone hills. *Epipogium gmelini*, upon mouldering roots of trees, in mountainous woods. *Spiranthes autumnalis*, in meadows. *Neottia Nidusavis*, growing upon roots of trees, in woods. *Listera ovata*, in damp places, in common woods. *L. cordata*, in mountain meadows and woods. *Epipactis latifolia*, in forests. *E. atropurpurea*, in mountain woods, particularly upon limestone. *E. viridiflora*, in shady places. *E. palustris*, in meadows. *Goodyera repens*, in fir woods among moss. *Cephalanthera rubra*, in shady woods. *C. ensifolia*, in shady forests. *Cypripedium calceolus*, in shady woods."—*Gard. Chron.*

Stove for Tender Species.—The following is the plan of a stove for these plants erected at Ealing Park, and for which I am indebted to the *Gardener's Chronicle*.

Fig. 105.



"The roof consists of three spans, which cover a breadth of something more than fifty feet, and is supported by columns, c c, to which creepers are trained. In the centre is an irregular piece of water, A A, called the 'lake,' surrounded by rock-work edging, heated by pipes passing through it from the boiler B, and containing aquatic plants. The flooring of the house

and the shelves, B B, are of slate. Parallel with the shelves, and separating them from the narrow part of the lake, are beds, D D, raised two feet and a half above the level of the floor, and each furnished in the middle with a tank, C C, the water of which is heated by a turn of pipe passing through it. At the north end, the house is closed by a solid wall, covered with bark and rough projections for ferns and such plants, at the other end it opens into what is called the plant house by two doors. The heating apparatus consists of a boiler, B, at the close end of pipes running through the water and under the slate shelves.

"The heating apparatus," Mr. Butcher says, "is found to suit admirably as regards the temperature, both of the house and of the lake and tanks of water. The circulation of heat being continued under water, communicates sufficient warmth for the double purpose of creating an evaporation beneficial to the plants, and making the water of suitable temperature when applied by syringe or watering pot.

"We can always command ten degrees of heat in this house above the temperature of the plant stove, connected with and heated by the same apparatus, an arrangement of some importance, as it allows for placing in the plant stove those *Orchidaceæ* which require a lower temperature when in a state of rest.

"The boiler is formed of cylindrical pipes placed in rows alternately above each other, all heated by one or two fires at pleasure.

"From the roof as well as from trees placed in the centre of the lake, we suspend the *Orchidaceæ* in baskets; and on logs of wood on the two large raised pits and wide shelves around the house, which complete the internal arrangements, we place plants in pots. Those of your readers conversant with floricultural affairs during that period, may remember the many prizes which have been awarded to specimens from our collection, and as this fact forbids the charge of presumption, I will explain our mode of treatment by taking the genus *Zygopetalum* for an instance.

"When the plants are commencing their growth, (generally about the month of October,) a pot of suitable size

is filled three parts full of potsherds and the remainder with close peat, fastened down with pegs of wood. I prefer close peat for this genus, as I have found it do better than in lighter or more fibrous peat.

"The plant so potted is then placed in the Orchidaceous house, temperature ranging from sixty to seventy degrees, the atmosphere moist, the plant kept moist and more liberally supplied with water as it advances in growth.

"When it has completed its growth, it is removed to the plant-stove where the temperature is from fifty to sixty degrees, and water is given sparingly, but the plant is never allowed to become quite dry. It there remains until it again commences growth, when it undergoes the same routine as before."

Compost.—The best we have noticed is this recommended by Mr. T. Appleby:—

"Procure a quantity of sphagnum or common bog moss, have it dried and then chopped small. To this add half-rotten willow or poplar wood, on account of their lightness and the absence of resin, chopped into small pieces of various sizes, the largest not bigger than pigeons' eggs. To these add the under stratum of sphagnum, which has become almost peat, likewise chopped fine, the whole in about equal parts.

"These make altogether a light open compost, which appears admirably to suit the plants, as they root in it freely and thrive; I use it chiefly for the species that grow upon trees. For such as grow upon the ground, I use stronger compost."—*Gard. Chron.*

Culture.—The following general suggestions are from Mr. Bateman's most valuable work on the Orchidaceæ of Mexico and Guatemala:—

"Supposing the plants established in a suitable house, then the following rules will be found to contain all that is most essential for their successful management.

"1st. *The plants can scarcely have too much light or too little sun.* Light prevents mildew, strengthens the fibre, and checks the disposition to throw up a succession of weakly shoots, which are quite incompatible with the production of flowers. The sun, on the contrary, scorches and turns the leaves yellow, especially when it first begins

to shine powerfully upon plants that have just left their winter quarters. In order to secure as much light as possible, many species should be suspended in the air from rafters or chains, some being placed on blocks of wood, (cork-wood is the best,) or fragments of cocoa-nut husks, and others in baskets of wire or wicker work filled with moss and broken peat, or in pots with pierced sides. The latter answer perfectly for plants (*e. g.* the *Saccolabiums*) which are of slow growth, and thrust their roots into the air. Baskets answer best for *Stanhopeas* and the like. To prevent injury from the rays of the sun, shading is of course necessary; but this should be so arranged as to be easily removed, as it ought not to be continued for more than ten or twelve hours on the very longest summer's day. Exotic climbing plants introduced sparingly are advantageous, and have a good effect.

"2d. *Take care of the roots.* On the health of the roots everything depends. The winter is with them the most critical season, for if suffered to grow too dry, they shrivel up and perish, if too wet they rot. Much of course depends upon the mode in which the plants are potted, and which should be such as to admit of their readily parting with all superfluous moisture, and to secure this, nothing is better than a plentiful admixture of broken pots-herds. High potting is now so generally practised in good collections, that it is needless to insist upon its importance.

"Rapidly growing plants, such as the different species of *Phaius*, *Gongora*, *Peristeria*, *Stanhopea*, &c., require to be broken up and entirely repotted every second or third year; on the other hand, there are some air plants, &c., that may remain undisturbed for five or ten years together.

3d. *Beware of noxious insects.* Orchidaceæ are more particularly exposed to the attacks of the following insects: woodlice, crickets, and cockroaches, the thrip, a minute woolly white scale, and a diminutive species of snail, the two last being infinitely the most pernicious. Woodlice are easily kept in check by placing the plants on saucers, or within troughs filled with water, especially if the valuable aid of a few toads be called in. The Oniscampitre Epiphyte Stand, invented by Mr. Lyons,

is an ingenious and no doubt effectual way of accomplishing the same end. It is made by merely fixing a forked branch or back of wood, to the raised centre of a massive saucer or feeder, which being kept constantly full of water, forms a sort of foss, impassable to vermin, round the plant it is intended to guard; crickets and cockroaches are very fond of flour scapes, and to be dreaded accordingly; red wafers scattered over sand among the pots are to them very tempting baits, and if swallowed, the red lead they contain acts as a poison; but these pests are best destroyed by the mixture recommended for the white scale. The thrip does not do much mischief, except where plants are either neglected or grown in too hot and dry a temperature. It usually first appears among the lataseta, and is to be removed by careful washing. Small snails abound in some collections, while in others they are unknown: it is difficult to conjecture whence they come, and all but impossible to eradicate them entirely. They batten upon the tenderest roots, such as plants put forth when they are just beginning to grow, and if not kept in check would speedily produce irretrievable mischief. Lettuce leaves, slices of potato, turnips, &c., are very enticing, and while they divert the attention of the enemy from the roots, they also afford an opportunity of capturing him. The collections which are watered exclusively with rain water are the least infested. But the worst plague of all is the small white scale, which in its first insidious approaches, appears only as a white speck upon the leaves, then covers them with a soft whitish down, and finally kills them. For this the following remedy will be found efficacious, viz.: dissolve half a pound of camphor in a pint of spirits of wine, the result will be an impalpable powder, to which add one pound of scotch snuff, one ditto pepper, one ditto sulphur, and keep in a bottle carefully stopped. This mixture should be dusted over the infected parts, and repeated whenever or wherever the enemy shows itself. If persisted in for some time the mixture rarely fails to effect a perfect cure; and it has the further good property of acting as a more deadly poison to cockroaches, &c., which have quite disappeared in the collection at Knypersley

since this mixture came into frequent use. Besides the above annoyances, the red spider and the brown scale are frequently injurious, but never except in cases of gross neglect.

4th. *Give the plants a season of rest.* Without a season of rest most plants will not live at all, and others do so very imperfectly. It is easily accomplished in a variety of ways, either by moving the plants from the warmer to the cooler end of the house, or by diminishing the quantity of water, or by placing them in a cooler house. Even exposure in a hot dry atmosphere, although it scorches their leaves, not unfrequently throws them into vigorous flower. Plants from the East Indies and from other climates, where the extremes of drought and wet are not felt so severely as in Brazil or Hindostan, require a season of rest proportionally short, and of a less decided character.

5th. *Attend to the condition of the air.* In winter, 60° to 65° is a wholesome temperature for most of the species; in the summer it may rise to 70° or 75°, or even higher if derived from the heat of the sun. Where there are two houses, the warmer one should not be lower than 70° even in winter, but fortunately there are comparatively few kinds that insist upon so hot a berth.

“The air should always be soft and nearly saturated with moisture. The latter should, however, be prevented from dripping upon the plants as it condenses, and this is easily effected by fixing a small copper pipe or piece of channeled wood under each rafter and sash-bar, to catch and carry off the water.

6th. *Do not over-water.* This a beginner is very apt to do, and a grievous fault it is. When plants do not shrivel or flag, it is a sign that they are content with the humidity that the atmosphere of the house supplies. When watering is necessary, it should not be done indiscriminately, but according to the wants of particular plants. It is also of great importance to use rain water only, which may be collected for the purpose in a tank, as shown in the plan of Mr. Rucher's house, and which should not be applied of a temperature below 60°.

“Syringing in moderation may be had recourse to in hot weather. Some of the sobralias, together with bromheadia

palustris, grow more vigorously if their pots are set in saucers of water during the summer months.

“To the foregoing rules the following advice may be added. Do not aim at having too large a collection, but rather strive to grow a few good kinds in the best style.”

ORCHIS. Thirty species. Chiefly hardy orchids. Seed. Chalky loam and peat.

ORIGANUM. *Marjoram*. Eight species and some varieties. Hardy herbaceous and half-hardy evergreen shrubs. The former are increased by division; the latter by slips and cuttings. Sandy loam. See *Marjoram*.

ORMOSIA. Two species. Stove evergreen trees. Cuttings. Sandy peat.

ORNITHIDIUM. Two species. Stove epiphytes.

ORNITHOCEPHALUS. Two species. Stove epiphytes. Both these genera are increased by dividing the bulbs, and planting them in moss and wood.

ORNITHOGALUM. Fifty-nine species. Hardy, half-hardy, and green-house bulbs. Offsets. Sandy loam and peat.

ORNITHOGLOSSUM. Two species. Green-house bulbs. Offsets. Sandy loam and peat.

ORNIX *rhodophagella*. Rose Moth. Mr. Kollar says that—“In early spring, as soon as the rose tree begins to bud, if the new leaf-shoots are closely examined, a little brownish seed is found here and there attached to them, in which a worm—the larva of a small moth, is concealed, which gnaws the tender shoots. When it has devoured one shoot it removes, with its house, and attacks another; and thus, in a short time, one of these larvæ can strip a whole branch of its shoots. The larva, which lives in the little case, is only a few lines long, yellow, with a black head, and black spotted collar. It undergoes pupation in its case.

“The moth appears at the end of May. It is only three lines long, carries its wings very close to its body—almost wrapped round it. The whole body is silvery shining gray, the upper wings strewed with minute black dots, deeply fringed at the posterior edge. The moth lays her eggs in May on the buds of the rose tree, and the caterpillars are hatched at the end of June.

They immediately form for themselves small cases of parts of the leaves, and pass the winter in them at the root of the rose-tree.”

ORNUS. Flowering ash. Five species. Hardy deciduous trees. Seed and grafting, or budding, on common ash. Light loam.

ROBUS. Thirty-eight species. Hardy herbaceous, except *O. saxatilis*, which is annual, and *O. Americanus*, a green-house evergreen shrub. Seed and division. Light loam.

ORTEGIA. Two species. Hardy herbaceous. Seed and cuttings. Sandy loam and peat, well drained.

ORTHOTÆNIA. *O. resinella*, turpentine moth; *O. turionana*, bud tortrix. See *Tortrix*.

ORTHROSANTHUS *multiflorus*. Green-house herbaceous. Seed and division. Loam and peat.

OSAGE-APPLE. *Maculura*.

OSBECKIA. Six species. Stove shrubs, deciduous, and evergreen. Young cuttings. Sandy loam and peat.

OSIER. *Salix viminalis*.

OSMITES. Three species. Green-house evergreen shrubs. Cuttings. Light rich soil.

OSMUNDA. Seven species. Hardy ferns. Seed and division. Light rich loam.

OSTEOSPERMUM. Thirteen species. Green-house evergreen shrubs. Cuttings. Light rich loam.

OSTRYA. Hop-hornbeam. Two species. Hardy deciduous tree. Seed and layers. Common soil.

OTANTHUS *Maritimus*. Hardy herbaceous. Cuttings. Sandy loam.

OTHOUNA. Twenty-six species. Green-house evergreen shrubs, herbaceous, and bulbs, except *O. tagetes*, an annual. This is increased by seed, and the others by cuttings, division, or offsets. Light rich loam.

OTIORHYNCHUS *sulcatus*. The succulent Weevil. Mr. Curtis remarks that:—

“Sedums, and other succulents, in green-houses, will frequently be observed to get sickly, and perhaps die, without any apparent reason. When this is the case they should be carefully examined, and the grubs of the weevil will be found to have eaten off the plant close to the surface of the soil.

“These grubs are about half an inch long, of a dirty white colour, thick and

fleshy, slightly curved, and having numerous short rigid hairs on the body. About the middle of May these grubs change into white pupæ, which have no cocoons, but are placed in oval cells, in the earth, perfectly smooth on the inside. They remain in the pupa state about fourteen days, and become beetles. In this latter state they are quite black, and the elytra, or wing-cases, are rather deeply furrowed. In the Berlin Botanic Garden they have been found to infest the roots of saxifrages and trollius, growing in the open border, and cause their death.

"The only methods of destroying them are, at this time of the year, to examine the roots of sedums and other succulent plants, and crush all that may be found; and in June, when the perfect insects appear, to look among the pots, where they are usually lurking, and kill them as soon as they come out, before they have time to deposit their eggs."—*Gard. Chron.*

O. tenebricosus. Red-legged garden-weevil. Mr. Curtis says,—

"The maggots of the red-legged garden-weevil are found round the base of the stems of wall-fruit, sometimes in very great quantities, a few inches below the surface, where they undergo their transformations. The beetles, which are old offenders, come out only at night to feed upon the buds of wall-fruit, doing great mischief to apricots, peaches, nectarines, plums, &c. They first destroy the fruit, and subsequently attack the bark and leaves, so as not unfrequently to endanger the life of the trees. They commence their depredations in April by eating the unexpanded blossom-buds, clearing out the centre, and leaving only the external bractea, and occasionally fragments of the immature leaves. They will thus proceed along a branch until all the buds are destroyed, and afterwards demolish the young eyes which ought to produce wood-shoots, until nothing is left but the bare branches.

"The beetles bury themselves by day in the earth, close to the foundation of the wall to which the trees are trained, likewise round the stems of the trees, and most probably in chinks of the bricks, and other dark hiding-places. When recently hatched it is clothed with a delicate yellow pubescence, forming little irregular spots

upon the elytra; but they soon wear off and disappear, when it becomes of a shining black, inclining to a pitch-colour.

"The larvæ of these otiorhynchi being as destructive as the perfect beetles, the main object ought to be to destroy the former, if possible, in the autumn, which probably would be most readily effected by stirring the earth all along the base of the wall and round the stems of the fruit-trees, and then sprinkling salt pretty thickly over the broken surface; or salt and water, or, perhaps, liquid-manure, might be equally beneficial—if hot the better; for it seems evident, from the peculiar spots in which they generate, or rather undergo their transformations, that situations sheltered in a great measure from the wet are most congenial to their habits.

The beetles can only be arrested by hand-picking, with a candle and lantern, and afterwards pouring boiling water upon them, as their shells resist moderate heat."—*Gard. Chron.*

O. notatus attacks the young shoots of the raspberry and rose, piercing them to the pith.

OXALIS. Wood-sorrel. One hundred and twenty-four species. Chiefly green-house half-hardy and hardy bulbs, though some are shrubs, others herbaceous, and a few annuals. The bulbs are increased by offsets, the shrubs by cuttings, the herbaceous by division, and the annuals by seed. They all thrive in sandy loam, manured with leaf mould. See *Sorrel*.

O. Deppii.—Plant bulbs of this in pots, at the beginning of March, and shelter in a cold pit or green-house. When all fear of frost is passed plant them in a light soil, and in a southern aspect, about twelve inches apart each way; or the bulbs may be kept out of the ground altogether until the middle of April, and then be planted at once in the open soil. It should be trenched, and a little manure turned in with the bottom spit, as for other tap-rooted crops. The scaly bulbs, from which it is propagated, grow in a cluster round the crown of the root. The only cultivation required, is to keep the crop free from weeds, and to water plentifully in dry weather; otherwise, if the roots are allowed to become dry, they split upon the occurrence of moist weather. Protect from early frosts, in

October or November, by a mat covering.

About ten roots are enough for a dish. They are very useful as a vegetable from early in October to the end of December; and Mr. Cockburn, gardener to the Earl of Mansfield, at Canewood, thinks they would be more cultivated if better known. An inferior kind has often been substituted for it, viz., the *Oxalis Jacquiniana*; but this is distinguished by having pink flowers. In Belgium, the leaves, being gratefully acid, are used for the same purposes as sorrel, and the flowers are mixed with other salad herbs.—*Gard. Chron.* 182, and *Hort. Trans. of Lond.* iii. N. S. 30.

As it is not a very common vegetable, it may be useful to state, as an improved mode of cooking, that after peeling the tubers, and cleaning out their hollow centres, they must be well boiled in rich stock (gravy), skimming off the fat, and then be served up hot, with a sauce made of a little butter heated until brown, with a spoonfull of flour, and a little of the stock.

OX-EYE. *Bupthalmum*.

OX-EYE DAISY. *Chrysanthemum leucanthemum*.

OX-LIP. *Primula elatior*.

OXYANTHUS *speciosus*. Stove evergreen shrub. Young cuttings. Loam and peat: abundant watering.

OXYBAPHUS. Twelve species. Chiefly hardy and half-hardy trailers and creepers. Seed. Common soil.

OXYCOCCUS. Cranberry. Three species. Hardy evergreens. See *American Cranberry*.

OXYLOBIUM. Ten species. Green-house evergreen shrubs. Young cuttings. Loam, peat, and sand.

OXYPETALUM *appendiculatum*. Stove evergreen twiner. Cuttings. Peat and loam.

OXYRIA *reniformis*. Mountain sorrel. Hardy herbaceous. Division. Common soil.

OXYSTELMA *esculentum*. Stove evergreen twiner. Cuttings. Peat and loam.

OXYTROPIS. Twenty-eight species. Hardy herbaceous alpine. Seed. Sandy loam and peat.

OXYURA *chrysanthemoides*. Hardy annual. Seed. Common soil.

OYSTER-SHELLS. See *Animal Matters*.

OZOTHIAMNUS. Three species. Green-house evergreen shrubs, probably hardy. Young Cuttings. Loam and peat.

PACHIDENDRON. Seven species. Green-house tree aloes. Suckers and leaves, slightly dried. Sandy loam and calcareous rubbish.

PACHYPODIUM. Two species. Green-house deciduous succulents. Cuttings, slightly dried. Sandy turfy loam and peat.

PACHYRHIZAS *angulatus*. Stove evergreen twiner. Tubers, seed, and cuttings. Rich light loam.

PACHYSANDRA *procumbens*. Hardy herbaceous; and *P. coriacea*, stove evergreen shrub. Division or suckers. Common soil.

PÆDERIA *fatida*. Stove evergreen shrub. Cuttings. Rich light loam.

PÆDEROTA. Two species. Hardy Alpine annuals. Seed. Sandy loam.

PÆONIA. Pæony. Twenty-two species, and many varieties. The following are most worthy of cultivation:—

P. albiflora, white.

— *candida*, pinky.

— *fragrans*, red.

— *Humei*, red.

— *Potsii*, crimson.

— *Richardsonii*, white.

— *rubescens*, pink.

— *albiflora tartarica*, pinky.

— — — — — *Whitejii*, rosy.

— *anomala*, crimson.

— *arborea*, pink.

— *aretina Andersoni*, rosy.

— *lobata*, purple.

— *officinalis sabini*, crimson.

— — — — — *albicans*, white.

— — — — — *Baxteri*, crimson.

— — — — — *carnescens*, pinky.

— — — — — *rosea*, red.

— *paradoxa fimbriata*, purple.

— — — — — *peregrina Byzantina*, dark purple.

— — — — — *compacta*, purple.

— *Russii*, crimson.

— *sinensis*, pink.

— *tenuifolia flore pleno*, red.

— *moutan*, tree pæony, purple.

— — — — — *albida-plena*, white.

— — — — — *anemoneflora striata*, rose and white.

— — — — — *anneslei*, purplish pink.

— — — — — *Banksii*, or *Humei*, purple.

— — — — — *carnea plena*, rosy white.

P. moutan chrysanthemiflora, rose and cream.

———— *Compte de Paris*, dark rose and yellow.

———— *elegans*, white and sulphur.

———— *hericartiana*, bright rose and rosy white.

———— *lacera*, bright rosy red.

———— *lutea variegata*, rosy white and yellow.

———— *lutea alba*, rose and cream.

———— *papaveracea*, white.

———— *plenissima*, lilac.

———— *pumicea*, carmine.

———— *Rawesii*, pink.

———— *rosa-gallica*, rosy red.

———— *rosea*, pink.

———— *plena*, red.

———— *semiplena*, red.

———— *speciosa*, pink.

———— *striata*, rose and rosy white.

———— *sulphuria*, sulphur becoming white.

———— *variegata*, white and purple.

All the shrubby kinds are increased by cuttings, the same as is detailed hereafter in the cultivation of the tree pæony. The herbaceous kinds are propagated by dividing the roots; and new varieties of all are raised from seed. A rich light loam suits them.

TREE-PÆONY. *P. moutan*. Dr. Lindley's directions for cultivating this are as follow:—

“*Propagation*.—It is easily increased, and in several ways, when the plants are rather large and old; but when they are small and young it is rather difficult, and should not be attempted. They should be rather encouraged by watering freely during dry weather in summer; by mulching with a little rotten dung, and covering with a hand-glass, during the winter.

“When the plants are of a sufficient size and strength, they may be increased in the following ways:

“*By Division*.—Take up one of the largest plants about the end of October, and after shaking all the soil from the roots, separate each of the stems which have got any roots attached to them with a sharp knife; then shorten the top of each, and pot them in some good rich mould, placing them afterwards in a cold pit, where they are tolerably secure from frost, and where they can be kept dry during the winter. In the

spring place them where a little artificial heat is used; they will then begin to grow and make good plants, fit for planting out in the autumn.

“*By Layering*, which is performed in the following manner:—

“Select, either in October or February, some of the bottom shoots which are of the preceding year's growth; tongue and peg them down in the usual way, covering the layers, about three inches, with a mixture of light sandy peat, leaf-mould, and a little water in dry weather; but they must remain for two years attached to the mother-plant. There is another way of layering the tree-pæony, which is by selecting early in spring some of the bottom branches or stems, ringing them, with a sharp knife, about one inch above and below each bud, upon the stems; every bud will then occupy two inches of the stem, which is obstructed above and below. In ringing remove, in the usual way, a small ring of the bark all round the stem. The branches, so prepared, are then laid in the same way as the preceding, and the plants will be fit to separate in one year; but they will not be so strong as those raised in the preceding manner. The Chinese are said to practise budding the rarer ones, on the more common kinds, with great success; but that statement seems rather doubtful.

“*From Seed*.—This can only be done to increase the single ones, as the semi-double ones do not produce perfect seeds, or at least very seldom. When perfect seeds are obtained, shortly after they are ripe, they should be sown in pans filled with a mixture of fresh loam and a small portion of leaf-mould and sand, which should be placed in a cold pit or frame, and protected from wet until the following spring, when the seeds will begin to vegetate. If the seeds are not sown until the spring, they seldom grow before the following year; and frequently many of the seeds perish before that time arrives.

“The seedlings must be allowed to remain in the seed-pans the first season, and be transplanted the following spring, either into the open border, or singly in pots; and the time they are afterwards before they flower depends upon the treatment they receive, but generally they require two or three years.

"*From Single Eyes.*—Any time when the plant is in a dormant state, cut off a branch of the two or three year old wood, which has a quantity of buds upon it, and cut it into pieces of about two inches in length, leaving a single bud on each piece; then pot and treat them in the same manner as grape-vines are when raised from single eyes; that is, plant them about two inches deep in pots filled with good rich soil, and place them in a gentle moist heat. Plants raised in this way are good but small.

"*By grafting* on the roots of the herbaceous kinds, as of *P. officinalis*; but it is uncertain, and when it does succeed the plants are generally short-lived, except when the grafted part is placed sufficiently under the soil, in which case it frequently emits roots from the base of the graft, and becomes a healthy plant supported by its own roots.

"The operation of grafting is performed in the following ways:—

"Select some good tubers of the herbaceous pæonies—the Chinese *P. albiflora* and its varieties are the best—any time, early in spring, before the plant commences growing. Then cut off a small portion of the crown, and slit the tuber, from the top and downwards, sufficiently deep to admit the scion of the moutan-pæony, which must be of the last season's wood, fitting the bark of both well together, as in the ordinary way of grafting; and bind them tightly with strong matting. Then pot them singly in pots deep enough to cover the graft about an inch with soil, and place them in a cold pit or frame kept close, and give them but little water at first. They may also be grafted about the end of July or beginning of August, using the young wood of the current year in the same way as the preceding; but when they are grafted and potted they must be placed in a strong moist heat, and kept close with a bell-glass, as the wood, being rather soft, would soon perish if placed in a cold pit or frame.

"*Soil.*—It requires a strong rich loamy soil, with plenty of moisture, during the growing season: in swampy situations they will soon perish if they are in one when in a dormant state. A deep loamy or strong soil, with a dry subsoil, should be selected, and a light dry sandy or poor soil avoided; for in this

they never flower well, as they always suffer from drought. But even in such a situation they may be made to flower by adding a quantity of well-rotted dung, and a little fresh loam, to the soil.

"*Planting.*—In planting them in the open border the best time is the end of October; but they may be removed at any time except when they are either in flower or showing flower; but they will be liable to lose their flower-buds if they are transplanted after they commence growing.

"They seldom suffer much from moving if it is carefully performed in the autumn; for they may then be taken up from the open border, and potted for forcing them. Forcing requires great caution as regards the heat applied: if not done gently, and the plants allowed to make fresh roots before they are subjected to much heat, they will invariably lose their flower-buds during the time of forcing; and they must only be subjected to a moderate heat at any time—sixty degrees—as they are very apt to get drawn up weakly.

"When the forced plants have done flowering they should be again planted in the open border, cutting the principal shoots back at the same time: they will then be ready by autumn for repotting, and fit for forcing again the following spring. When potted they must be well protected, in a cool pit, from the frost.

"*Culture.*—When planted permanently in the border they should have an open situation which is not in the least shaded by other plants, and they will require a little more trouble except shortening some of the longest of the shoots before the spring, when they must be slightly protected to preserve the young shoots from injury by the frost, which is easily done by placing a single mat, or canvass covering, over them, at a sufficient distance from the plant, so as not to hurt the young shoots by pressure.

"The covering should be removed on all fine days, but replaced during the night. If the plants are small they may be covered with a hand-glass during the night; they will then flower freely during the early part of May, and the colours will be more brilliant."—*Gard. Chron.*

PALAFoxia linearis. Green-house herbaceous. Seed and division. Common soil.

PALICouREA. Three species. Stove evergreen shrubs. Cuttings. Sandy loam and peat.

PALIURUS. Two species. Hardy deciduous shrubs. Seed, root cuttings, and layers. Common soil.

PANÆTIA fulva. Green-house annual. Seed. Sandy loam.

PANCRATIUM. Twenty-nine species and many varieties. Chiefly stove and green-house bulbs, but *P. illyricum*, and *P. maritimum* are hardy. They are propagated by offsets, and new varieties raised from seed. They thrive best in a compost of three-fourths sandy loam and one-fourth leaf mould. Take up the hardy species in autumn, separate the offsets, and replant immediately about four inches deep in a light, well drained sheltered border, putting some mulch or six inches of coal ashes over them during the winter.

PANDAMUS. Twenty species. Stove palms. Seed or suckers. Rich light loam.

PANNING is forming a pan or basin in the soil round the stem of a tree or shrub in which to pour water.

PANSY or **HEART'S EASE.** *Viola tricolor.*

"This is one of the English florist's flowers, and spirited contests for prizes are yearly witnessed—in this country but little attention has been paid it; though its increasing beauty by the production of new varieties is claiming our regard. Those of us whose idea of a Heart's Ease is confined to the pretty little flower of former days, have but an imperfect conception of the size, figure and brilliancy to which the *Viola tricolor* has attained. For an interesting article on its culture see the "London Horticultural Magazine."

Varieties.—These are increased in number annually, but the following are established in public favour.

- Brown's Attila.
- Countess of Arkley.
- Curion.
- Cook's Attila.
- Alicia.
- Black Bess.
- Mulberry Superb.
- Prince Albert.
- Ringleader.
- Triumph.

Davies' Miss Nugent.

Foster's Man of Kent.

King's Exquisite.

— Princess Royal.

— Sulphura Elegans.

Kitley's Bathonia.

Lane's Sir John Sebright.

Lidgard's Jewess.

Major's Bridegroom.

— Beauty of Knosthorpe.

— Princess Royal.

Maule's Princess Royal.

Pearson's Agnes.

— Black Prince.

— De Buch.

— Magraith.

— Milton.

— Sobieski.

Scholfield's Surprise.

Silverlock's Prince Albert.

— Prince of Wales.

Thompson's Attila.

— Beauty of Bucks.

— Corona.

— Cream.

— Cyclops.

— Desirable.

— Duchess of Richmond.

— Hamlet.

— Jewess Superb.

— Launcelot.

— Miss Stainforth.

— Nymph.

— Prince Albert.

— Princess Royal.

— Regulator.

— Raphael.

— Rufus.

— Ultraflora.

— Venus.

— Warrior.

Characteristics of Excellence.—"The first and most essential quality is its form, which will be found in the greatest perfection in that flower round which if a circle be drawn each petal will exactly touch the circle, not projecting beyond it, nor stopping short of it. The petals should be large and broad, because in that case the indentations must be shallow where the outline of one petal meets another. Of a firm texture, flat, even at the edge, and free from notches. The eye must be clean and well defined, the colours should be rich and vivid, and the markings must have a clear edge. A uniform tint as a ground colour is much esteemed; but the variations and combination of colour are so numerous and beautiful, that no precise

rules can be formed to govern this point."—*Gard. Chron.*

Soil used by the best Pansey growers round Manchester, is the surface soil of an old pasture and partially decomposed cow-dung, about one part of the latter to two of the former.

Bed.—This should have a southeast aspect, unshaded by trees, but very sheltered from wind, be three feet wide, with a path all round, and then, having dug out the soil, be made eight inches deep of the above compost. The edges supported with slate.

Propagation.—*By Seed.*—Sow, as soon as it is ripe, or any time in spring or summer will do, in pans of the same compost plunged in an open border. In six weeks the seedlings appear. Save seed from the best shaped flowers, impregnating these mother plants with pollen from bright-eyed flowers. Gather the seed pods as they ripen.

By Cuttings.—The best season is mid August. Take short jointed cuttings from the approved plants, and insert their stems about two inches deep in some of the compost in a north border, covering with a hand-glass. They will have rooted in a month, then pot them, and keep in a dry situation until frost arrives, then put them in a cold frame plunged in coal ashes, covering the frame with a mat when frost is severe, and never letting the sunshine come upon them during frosty weather, but admit air freely.

Planting in Bed.—Do this early in April, in dry weather, placing the plants in rows twelve inches apart each way. Shade for a few days; and if night frosts occur shade them from the sun during the day after. They require no after-culture but frequent hoeing; never give water even in the driest summers, but at such seasons cover the surface of the bed with fresh cow-dung, sprinkled over with earth, to keep it from being unsightly.

Winter Protection.—Mr. Mearns, of the Manchester Zoological Gardens, recommends the Pansey grower, "instead of using frames and glasses, which are not always at hand, to trim and clean the ground, and loosen the surface carefully, and then to cover the whole of the plants about half an inch deep with a good rich compost. In the spring the plants will be found perfectly protected, and every extremity spring-

ing up in all directions, and they will blossom beautifully, if the subsoil be congenial to them. If laid in the soil, cuttings of the choicest pansies may be taken off at any season, even in the depth of winter. If it is convenient for the amateur to procure them at that season, he may lay the whole cutting beneath the surface, either in coil or longitudinally, so that it is not buried above half an inch or a little more. It will spring up at most of the joints in due season vigorous and healthy."—*Gard. Chron.*

Box for exhibiting Blooms.—Dr. Lindley says, that—"the best constructed box for exhibiting twenty-four Hearts-ease is made of deal, of the following dimensions, viz., twenty inches long, one wide, and five inches deep; the lid was made to unhinge; a sheet of zinc was fitted inside, resting upon a rim; four rows of six holes each were cut in the zinc at three inches apart, under each hole was a zinc tube soldered to the plate, and intended to contain the water. The apertures to admit the flower should be made in the form of a keyhole, as it will admit part of the calyx and keep the flower in a flat position, the outside may be painted green, but the zinc plate should be painted of a dead white."—*Gard. Chron.*

Insects.—The worst animal foes of the Pansey are the slug and the snail. To destroy and keep away these vermin, water the bed late of an evening in moist weather with lime water, and sprinkle the surface pretty thickly with fresh wood ashes. See *Agromyza*.

Disease.—The Pansey is liable to root-rot, if the soil is not well drained. If grown in light, fresh earth, in an open border, it is never subject to the disease. If a plant, which shows by its yellow hue that infection has occurred, be taken up, the decayed roots removed, and it be transplanted into a soil and situation such as I have described, it will speedily send forth fresh radicles, and recover its vigour.

PANSEY FLY. *Agromyza*.

PANTILES. See *Bricks*.

PAPAYER. Poppy. Twenty-six species and many varieties. Hardy herbaceous and annuals. The former are increased by division, the latter by seed; light rich loam.

PAPER LIGHTS were never much

employed, and, since the introduction of Whitney's and other compositions for rendering cloth semi-transparent, are still less likely to be employed. Cartridge paper is the best for the purpose. It should be damped before it is nailed upon the frame, because when dried it becomes taut. It may then be painted over with boiled linseed oil, in which a little white lead has been incorporated. In nailing on the paper, a strip of tape should be placed between the heads of the tacks and the paper, to check the tearing to which the paper is so subject.

PAPER-MULBERRY. *Broussonetia papyracea*.

PAPYRUS. Four species. Stove perennial aquatics. Seed and division. Rich loam in water.

PARAGUAY TEA. *Ilex paraguayensis*.

PARASITIC PLANTS are such as derive their nourishment from other living plants by rooting into their sap vessels. Examples are the Mistletoe and Dodder, which attach themselves to the stems and branches of some plants; the *Hypocistis*, and the *Orobanche* or Broom rape, affix themselves to the roots of others. The minute fungi which constitute the mildew are also parasites. There is some doubt whether the ivy is at all parasitical; but whether it derives nourishment or not from trees, it certainly checks the respiration, and prevents the free access of light and air to those upon which it attaches. The orchidaceous plants, which grow upon dead wood as readily as upon living timber, are not parasites.

PARASTRANTHUS. Three species. Hardy herbaceous. Division. Sandy loam and peat.

PARDANTHUS. Two species. Hardy herbaceous. Seed and division. Light rich sheltered border.

PARINARIUM. Three species. Stove evergreen shrubs. Ripe cuttings. Sandy loam and peat.

PARING and BURNING is never to be practised by the gardener, except for the purpose of charring the turf and rendering porous the soil cut from the banks of clayey ditches. When this is carefully done, a serviceable dressing is obtained. But paring and burning, as a general practice, is extremely wasteful; and though it may give a

good crop immediately afterwards, never fails, by speedy exhaustion, to demonstrate how great has been the dispersion of carbonaceous matter.

PARIVOA grandiflora. Stove evergreen tree. Cuttings. Rich loam.

PARK, in the modern acceptation of the word, is an extensive adorned inclosure surrounding the house and gardens, and affording pasturage either to deer or cattle. In Great Britain, a park, strictly and legally, is a large extent of a man's own ground inclosed and privileged for wild beasts of chase by prescription or by royal grant. (*Coke's Litt.* 233. *a. Blackstone*, 2. 38.) The beasts of park, or chase, according to the definition of ancient sportsmen, were the buck, doe, fox, marten, and roe; but in a common and legal sense, Coke says, beasts of park were all the beasts of the forest. It has been decided by the superior courts of law, that to constitute a park these circumstances are essential:—1. A grant from the king, or prescription. 2. That it be inclosed by a wall, pale, or hedge. 3. That it contain beasts of park, and if it fail in any one of these, it is a total disparking. (*Croke Car.* 59.) Of such parks there are said to be 781 in England. (*Brooks Abr. Action sur Stat.* 48.)

PARKIA. Two species. Stove evergreen trees. Cuttings. Peat and loam.

PARKINSONIA aculeata. Stove evergreen shrub. Imported seed and cuttings. Peat and loam.

PARNASSIA. Five species. Hardy herbaceous. Division and seed. Shaded moist peat.

PAROCHETUS communis. Half-hardy evergreen creeper. Division. Light rich loam.

PARONYCHIA. Fourteen species. Chiefly hardy perennials and annuals. *P. canariensis* is a green-house herbaceous, and a few others are half-hardy. Seed and division. Sandy loam.

PARRYA arctica, a hardy annual. *P. integerrima*, a hardy perennial trailer. The first increased by seed, the latter by cuttings. Loam and peat.

PARSLEY. *Petroselinum sativum*. *Varieties.*—There are two varieties, the common plain leaved and the curly leaved.

Time and Mode of Sowing.—It is

sown annually, but if it is never permitted to run to seed, the stalks being cut down as often as they rise, it will last for several years. It may be sown from the close of February until the middle of June, and this is repeated about the middle of September, for the supply of winter and spring; but this is unnecessary if the plants are not allowed to seed. The seed is to be inserted moderately thick, in narrow drills barely an inch deep, twelve inches apart if in a bed by itself, or in a single one round the edge of a bed; the mould being raked level, and the stones immediately over the seed gathered off. The plants make their appearance in from two to six weeks. When two or three inches high, they may be gathered from as required. In early June, when they make a show for seed, the stems should be cut down close to the bottom, and again in September, if they have acquired a straggling rank growth; this will cause them to shoot afresh, and acquire a strong growth before the arrival of severe weather. On the approach of frost, if protection is afforded to the plants by means of haulm or reed panels, so supported as not to touch them; it will preserve them in a much better state for use in winter and spring. But a still more effectual plan is to take up some of the strongest and best curled plants in September, and to plant them in pots, two or three plants in each, using a rich soil. If these be placed in a forcing house and abundance of liquid manure given, they will be very superiorly productive throughout the winter.

To obtain Seed.—Nothing more is necessary than to allow some of the plants to run up in June; they should not, however, be allowed to stand nearer than eighteen inches to each other. The seed ripens in early autumn, and when perfectly dry, may be beaten out and stored. Soot is an excellent manure for parsley, and preserves it from root-canker, the only disease affecting it.

PARSLEY (Hamburgh). *Petroselinum sativum*, var. *latifolium*.

Use.—This esculent is known by the name *broad-leaved* and *large-rooted Parsley*. It is cultivated for its root, which attains the size of a middling parsnip, boiling exceedingly tender and palatable. It is eaten both as a sauce to flesh meat, and in soups, &c.

Time and Mode of Sowing.—Sow at monthly intervals from February until the middle of June. Sow thinly in drills nine inches apart. The plants appear in about a month after sowing, and when of tolerable growth, require to be thinned to nine inches asunder, and cleared from weeds, either by hand or the hoe; which latter operation, being performed as often as weeds appear, is the only cultivation required. By the end of July, or during August, the earliest sowings will have acquired a sufficient size for occasional use; but the roots seldom attain their full growth until Michaelmas; and the latest crops not until the following year. On the arrival of frost, some of them must be taken up; and after the removal of the superfluous fibres, decayed leaves, &c., buried in sand, in a dry situation under cover.

To save Seed.—Some plants must be left where grown, and allowed to run in May. Their produce will ripen in July or August, when it must be cut, dried, beat out, and stored.

PARSLEY-PIERT. *Erica aphanes*.
PARSNIP. *Pastinaca sativa*.

Soil and Situation.—The soil in which the parsnip succeeds best, is a rich dry sandy loam, and the deeper the better. The most inimical to it is gravel or clay. It is always beneficial to trench the ground two spades deep, a little manure being turned in with the bottom spit.

In the isle of Guernsey, which has long been celebrated for the fineness of its parsnips, sea-weed is the manure chiefly employed.

Of excrementitious manure that of pigeons is the best. Decayed leaves are also very favourable to its growth. The situation cannot be too open.

Time and Mode of Sowing.—The usual time for sowing is from the end of February to the beginning of April, but the earlier the better. It has been recommended in field cultivation to sow them in September; in the garden, when sown at this season, they also attain a finer size, but many of them run to seed. In the isle of Guernsey they regulate their time of sowing, according to the soil; in the most favourable soils they sow in January, or if the soil is wet or stiff, they do not insert the seed until the latter end of March.

Sow in drills ten inches apart, and

one inch deep; the compartment being laid out in beds not more than four feet wide, for the convenience of weeding, &c. When the seedlings are two or three inches high, remove to ten inches apart, and the weeds both by hand and small hoeing. The beds require to be frequently looked over, to remove all seedlings that may spring up afresh, as well as to be frequently hoed until the plants so cover the ground as to render it impracticable.

The roots may be taken up as wanted in September, but they do not attain maturity till October, which is intimated by the decay of the leaves.

In November, part of the crop may be taken up, and the tops being cut close off, layed in alternate layers with sand, for use in frosty weather. The remainder may be left in the ground, and taken up as required, as they are never injured by the most intense frost, but, on the contrary, are rendered sweeter. In February or March, however, any remaining must be extracted, otherwise they will vegetate. Being preserved in sand, they continue good until the end of April or May.

To obtain Seed.—Some of the finest roots are best allowed to remain where grown; or else, being taken up early in spring, planted in a situation open, but sheltered from violent winds. If of necessity some of those are employed which have been preserved in sand, such should be selected as have not had their tops cut off very close.

They must be kept clear of weeds, and in dry weather watered plentifully twice a week. At midsummer the seed is usually ripe; the umbels may then be cut, and when thoroughly dried on cloths, the seed beaten out and stored.

Seed should never be employed that is more than a twelvemonth old, as it has generally lost its vegetative power when of a greater age.

PARSONIA. Two species. Stove evergreen twiners. Cuttings. Loam and peat.

PARTERRE, a French word pronounced with the final *e* silent, is synonymous with our English name *Flower Garden*.

PARTING the roots is a mode of propagation available with some plants, and where a large increase of an individual specimen by this mode is desired, its flower stems should be removed as

fast as they are produced. This makes the plant stool, for whatever prevents the formation of seed, promotes the development of root.

PASCALIA glauca. Half-hardy herbaceous. Cuttings. Loam and peat.

PASQUE-FLOWER. *Anemone pulsatilla*.

PASSIFLORA. Passion Flower. Eighty-five species, all evergreen climbers. Cuttings. Loam and peat.

Select Species and Varieties:—

HARDY OR HALF-HARDY, ACCORDING TO LATITUDE AND SOIL.

P. cerulea. Common Blue Passiflora. Five slightly differing varieties, the best of which are *P. Colvillii* and *P. glaucophylla*. All require the protection of a wall.

GREEN-HOUSE.

P. incarnata. Flesh-coloured Passiflora. This, in well drained borders, will endure our winters against a south wall. *P. Fieldii* is a variety of this.

P. chinensis. Chinese Passiflora.

STOVE.

P. alata. Winged Passiflora. Purple, white, and crimson.

P. alata-cerulea, Hybrid-winged Passiflora. Black, blue, and white.

P. actinia. Sea Anemone Passiflora. White, fragrant.

P. kermesina. Crimson Passiflora.

P. Loudoni. Loudon's Passiflora, purple.

P. Middletonia. Middleton's Passiflora. Green and pink, fragrant. Sometimes called *P. fragrans*.

P. Phænicea. Phœnician Passiflora. Crimson, purple, and white. *P. elegans* is a variety of this.

EDIBLE FRUITED PASSIFLORAS.

P. edulis. Purple-fruited Granadilla. White. Green-house.

P. laurifolia. Laurel-leaved Granadilla, or Water Lemon. Red and violet flowers. Fruit, yellow. Stove.

P. maliformis. Apple-fruited Granadilla, or Sweet Calabash. Flowers white, blue, and red. Fruit, dull yellow.

P. quadrangularis. Common Granadilla. Flowers, red, white, and violet. Fruit, greenish yellow. *P. Buonaparteana* is a variety of this.

EDIBLE FRUITED.

All the stove passion flowers thrive in a day temperature of 70°, with a

night temperature of 50°. Mr. Jones, of the Kew Gardens, has given the following directions, especially, for the cultivation of *P. quadrangularis*; but they apply equally well to the other species.

"It may be grown in the stove, or better perhaps in an intermediate house, between the stove and greenhouse. It is necessary to the perfect cultivation of the plant that it should grow in a border in the inside of the house, rather than in pots, however large. If no other situation presents itself, a border may be made beneath the path, taking care to leave a space of three or four inches between the surface of the soil and the stones, so that there may be a free access of air, and that water may spread equally over the surface of the soil, and moisten it thoroughly. Whatever may be the situation of the plant, let the drainage be as efficient as possible.

"As the plant may have to remain some years in one situation, five or six barrowfuls, or even more, of good soil, composed of three-fourths rich loam, and the rest leaf mould, should be prepared in a very rough state, and in this plant it. A spare rafter, or any such place near the glass, will do exceedingly well for the plants to be attached to. If young when turned out, they should not be allowed to bear flowers or fruit the first year.

"One or at most two branches should be allowed to grow, and after they have extended ten or fifteen feet, they should be stopped, and should not be allowed to put forth any laterals.

"During winter no water to be given unless the plants droop. Some time in February the branches must be well cut back; and if necessary to leave any length of stem between the ground and the glass, all the buds, excepting three or four at the top of each branch, must be rubbed off.

"The number of branches allowed to grow in the second year, must be determined by the strength of the plant, from two to six being the usual number.

"Advantage should be taken of the first flowers that open to fertilize the stigma, for fructification will not always take place naturally. From one to three fruit are sufficient on each branch; if a greater number are al-

lowed to remain they will be small and of little value.

"The fruit-bearing branches may be stopped at the distance of five or six feet above the fruit.

"Treated in this way *P. quadrangularis* will frequently produce fruit 4 lbs. in weight; and though not ranking as a first-class fruit, it makes a rather novel as well as a useful addition to the desert, at which the pulp is eaten with sugar and wine. None of the other species of *Passiflora* bear such large fruit as *quadrangularis*. Of others, *edulis* and *laurifolia* are amongst the best. Unlike *quadrangularis*, the branches of these smaller-fruited species must not be stopped, and they will continue to flower and fruit for several months in a stove. The fruit is eaten with the same ingredients as the largest kind, and has a flavour agreeable to most palates."—*Gard. Chron.*

PASSION-FLOWER. *Passiflora*.

PASTINACA. The only cultivated species is the *Parsnip*, which see.

PATAGONULA *Americana*. Stove evergreen shrub. Cuttings. Loam and peat.

PATERSONIA. Nine species.—Green-house herbaceous. Division and seed. Sand and peat.

PATRINIA. Four species. Hardy biennials. Seed. Light rich loam.

PAULLINIA. Sixteen species.—Stove evergreen twiners. Ripe cuttings. Light rich loam.

PAULONIA *imperialis*, is a hardy tree, though, until its habits are better tested, it is advisable to plant it in a sheltered situation. Mr. G. Bishop, gardener at the Chiswick Gardens, states that—"It may be propagated by cuttings, particularly if the young shoots are selected when they have advanced to about three or four inches in length; also by eyes, in the same manner as the vine; as well as by divisions of the roots, the smallest particle of them generating adventitious buds. The best time to propagate it is when the plants commence their spring growth. Both eyes and roots should be potted in soil consisting of leaf mould, peat, and sand, in equal proportions, and the pots containing them plunged in a dung-bed. Any other fermenting material would answer the same purpose, where the atmospheric

temperature averages from 75° to 80°. Divisions of the root in particular will emit shoots at the expiration of three weeks at the farthest.”—*Gard. Chron.*

For a drawing and interesting article on this recently introduced tree, see the “*Horticulturist*.”

PAVETTA. Three species. Green-house evergreen shrubs. Cuttings. Sandy loam and peat.

PAVIA. Seven species. Hardy deciduous trees and shrubs. Layers and grafting on horse-chestnut. Common soil.

PAXTONIA rosea. Stove orchid. Division. Very turfy loam, leaf-mould, and sand.

PEA. *Pisum sativum.*

“The Pea is a hardy annual, a native of the south of Europe, and cultivated from time immemorial.

“There is an immense variety, from which the following have been selected as among the best, and more than sufficient for any garden; some inferior kinds are still cultivated, apparently from want of knowledge.

“Landreth’s Extra Early; this has been introduced more than twenty years, and to the present maintains its superiority over all others, as an early variety; it is unquestionably the earliest, and a general favourite.

“The Early Frame succeeds *Landreth’s Extra Early*, and is followed by the *Early Charlton*, or *Golden Hotspur*, as it is likewise called.

“The Large White Marrow, Peruvian Black Eye do., Royal Dwarf do., and Blue Imperial, ripen nearly together; each has its admirers. The imperial is quite dwarf and may do without rods; many prefer it to all others.

“The Blue Prussian is an old sort, generally liked, and a good bearer.

“Bishop’s Early Dwarf continues longer than most others in bearing, and its habit being so dwarf, as not to require rods, is well suited to many gardens.

“Sugar or Eat Pods, generally boiled both pod and peas, and eaten in the manner of Kidney Beans.

“The Pea thrives best in a rich loamy soil, but will, with proper care, produce tolerable crops in almost any. The early varieties require stronger ground than the Marrowfats and Imperial, but in manuring for them, observe to use none but such as is

thoroughly decomposed, excluding all that possesses the least fermentation.

“It has been found that frequent sowings of peas in the same ground is injurious; the plants not unusually turn yellow, and partially die before perfecting fruit. This remark is particularly applicable to the early kinds.

“The first crops should be sown in the spring, so soon as the ground will admit of being worked, choosing the driest soil, and such as lays well exposed to the sun.

“To have a constant succession, a few should be planted every fortnight or oftener. At the time the last sowing of early ones is made, sow also some of the later varieties, which will come in as the early ones go out of bearing.

“The usual method of cultivation, is to sow the seed in drills, as directed for the Kidney Beans, only thicker in the drills. As the plants rise from half an inch high to two or three inches, begin to draw earth to the stems, doing this when the ground is in a dry state, and earthing gradually higher, as the stems ascend; at the same time loosen the ground between the young plants, and cut down rising weeds. Stick the plants when six to twelve inches high, as soon as they begin to vine. The early varieties require sticks or rods two to three feet high; the Imperial and Royal Dwarf Marrowfat two feet, Large Marrowfat five feet.”—*Rur. Reg.*

To force Peas:—*Forcing* commences in December, in the early part of which month they may be sown in a hot-bed to remain, or thick to transplant, during the succeeding month, into others for production. These may be repeated in January, and the transplanting takes place in February. It is also a common practice to sow in a warm border during October, and the plants being cultivated as a natural ground crop, are removed into a hot-bed in a succeeding month.

The hot-bed must be moderate, and earthed equally over to a depth of six or eight inches, with light fresh mould not particularly rich. The seed must be buried one inch and a half deep. The frame, which is required to be two feet and a half high behind, and one and a half in front, ought to be put on three or four days before the crop is inserted, that the steam and heat may abate. Seed may likewise be sown at

the above times in pots or pans, and placed round the bins of the stove. At the close of September also, some peas may be sown in pots and sunk in the earth of any open compartment; when the frost commences, to be removed into the green-house. A border of fresh earth being made in the front of it early in December, the plants are removed into it, in rows two feet asunder, or still better in pairs, with ten inches interval, and two feet and a half between each pair. These will come into production about the middle of March.

In every instance, as stated above, the rows should be two feet, the seed or plants being set an inch asunder. The plants are ready for moving when an inch or two high. They must be shaded and gently watered until they have taken root. As much earth should be preserved about their roots at the time of removal as possible.

Transplanted peas are most productive, and run the least to straw in the forcing frames. Air must be admitted as freely as possible under contingent circumstances, the same precautions being necessary as for cucumbers. Water must be given at first sparingly, otherwise decay or super-luxuriance will be occasioned; but when they are in blossom, and during the succeeding stages of growth, it may be applied oftener and more abundantly, as it is necessary for the setting and swelling of the fruit.

The shading during hot days, and covering at night, must also be particularly attended to. From three to five months elapse between the times of sowing and production, according to the fineness of the season, length of the days, &c.

The temperature may be uniformly kept up throughout their growth, having 50° for the minimum, and 70° for the maximum.

In Pots.—Mr. N. Wilson, gardener, of Gopsall, cultivates them in this manner:—

“The peas are to be ready for transplanting by the 1st of February, so that the same sowing does for the first out of doors, as well as for those. The seedlings are removed from the boxes or pots, where they have been thickly sown, when about four inches in height, and are planted thinly into large pots (twelves) which have been filled with good soil, not too rich. They are staked with moderately strong willows, and run round at distances of six inches with small twine, which has a neater appearance and does not shade so much as common pea sticks. The situation quite suitable is the back walls of the late vineries.

“The pots so filled and staked, are placed on the top of the back flues, elevated to the glass as near as the stakes will permit, where they are to remain till the crop is gathered, which will be from the 1st to the 15th of May. The peas are kept from the frost and severe weather, and have always plenty of air, when the weather is fine.

“They are watered rather sparingly at first, but plentifully as they advance into bloom. Peas in pits and frames will not bear forcing till they are out of bloom, and the pod set, then they will bear it, and be forwarded admirably. They cannot be had in the autumn on the same principle after the 20th of November.”—*Gard. Chron.*

PEACH. *Persica vulgaris*.

Varieties.—D. Landreth and Fulton offer the following among others as desirable varieties. The vicinity of Philadelphia is famous for the extent of its Peach orchards, and the abundance and excellence of the fruit. What is there considered worthy of culture may be safely relied upon.

EXPLANATION OF ABBREVIATIONS.—Colour—y yellow; r red; w white. Size—L large; M medium.

Those marked * are clingstones.

NAME.	COLOUR.	SIZE.	QTY.	SEASON.
*Algiers Winter	y	L	2	October
Alberge—Yellow Rare Ripe . . .	y r	L	1	August
*Blood Peach	r	L	2	September
Columbia	y	L	1	September
Darby Belle	y	L	1	September
Early York	r	M	1	August
Early Red, Cole's	r y	L	1	August
Eastburn's Choice	r	L	1	September
Freestone Heath	y	L	1	September
Early Malacoton, Crauford's . .	y r	L	1	September
Grosse Mignonne	y r	L	1	August
*Lemon Clingstone	y r	L	1	September
*Late Heath	w	L	1	September
Late Yellow, Pool's	y r	L	1	September
Large Early Rare Ripe	y r	L	1	August
Morris' Red	r	M	1	September
Morris' White	w	M	1	September
Nutmeg, White	w	M	1	August
Oldmixon Freestone	y	L	1	September
*Oldmixon Clingstone	r	L	1	September
President	y r	L	2	September
Red Rare Ripe	r	L	1	September
Red Cheek Malacoton	y r	L	1	September
*Rodman's Cling	w	L	1	September
Smock's Freestone	y r	L	1	September
*Smock's Cling	y	L	1	September
*Tippecanoe	y r	L	1	September
Washington	w	L	1	September
Ward's Late	w	L	1	September

The culture of the Peach is in this country so simple, and generally understood, that it would seem scarcely necessary to occupy space with directions on that subject.

The following remarks are from a paper by Dr. Thompson of Wilmington, Delaware, published in the *Farmer's Cabinet* of Philadelphia, and may excite surprise in some quarters by its details of the extent to which the Peach trade has arrived.

"To Mr. Isaac Reeves, a native of New Jersey, is the whole credit due of first introducing on a large scale the culture of the inoculated peach tree into Delaware. The late Mr. Jacob Ridgway, of Philadelphia, owning a farm near Delaware City, on the Chesapeake and Delaware canal, was induced by Mr. Reeves to become his partner, and upon this property, in the spring of

1832, they set out the first twenty acres of inoculated peach trees ever planted in this State, with the view of supplying the Philadelphia market. They rapidly extended their plantation to about one hundred and twenty acres, were eminently successful, and one year—the very best season they ever had—their gross income from the sales of fruit was some sixteen thousand dollars. Peaches then commanded from one dollar twenty-five cents to three dollars per basket, containing about three pecks. In the spring of 1836, the late Mr. Manuel Eyre and myself followed suit upon our 'Union Farm,' midway between Wilmington and Newcastle on the Delaware river, to about the extent of one hundred and forty acres. In a year or two afterwards, Mr. Philip Reybold & Sons went into the business—then a host of others, until now, from twenty-five

hundred to three thousand acres of land, in Newcastle county, are planted with, and successfully cultivated in peaches, making Delaware, though the smallest of the States, the largest producer of this fruit. The result has been a proportionate diminution of price, the average, per basket, one season with another, not exceeding from thirty to sixty cents. In this way Delaware has become the principal supplier of the Baltimore, Philadelphia, New York, and North River markets, and many of our fine peaches now reach even Boston. The whole annual income from this branch of business to the farmers of this county may be estimated from one to two hundred thousand dollars. For so handsome an additional product, the agriculturists of Delaware, as well as the consumers of peaches in our vicinity, owe a debt of gratitude to the *originator* of the culture, whom as one, I should gladly unite in presenting with some valued and lasting memento in recognition of his merit for giving a *new staple to a State*; for who is a greater benefactor to mankind and the age he lives in, than he who brings into operation a new branch of business, giving by his enterprise and perseverance an impetus to agriculture; causing the earth to give forth its increase, and so multiplies its fruits as to bring them within the reach and enjoyment of all? The great improvement made in peaches within the last few years in New Jersey and Delaware, consists in propagating none but the finest kinds, by *budding and grafting*, so as to have the fruit *as early and as late* as our latitude will admit; the earliest ripening with us from the first week in August, such as Troth's Early, Early York and Early Ann, and ending in the latter part of October with Ward's Late Free, the Heath, Algiers' Winter, &c. I need not enumerate all the different varieties used and planted out to keep up this succession—some of the principal are in the order of enumeration, Troth's Early, Early York, Early Ann, Yellow Rareripec, Red Rareripec, Malacatoon, Morris' White, Old Mixon, Rodman, Ward's Late Free, Malden, Free Smock, Late Rareripec, Heath, Algiers' Winter, &c. These trees are generally obtained for about six dollars per hundred, from approved nurserymen in Delaware and New Jersey, and the

rearing of them constitutes a distinct business of itself. They are produced by planting out the peach stones, or pits, in the spring, which have been slightly covered with earth in the fall, so as to be exposed to the action of the winter's frost. The sooner the pits are put in the sand or earth after the fruit is matured, the better—they should never become dry. The shoots from these stones are budded in August of the same year, from four to six inches from the ground. The ensuing spring all the first year's growth is cut off above where the scion has taken—not, however, until it is well developed—when, in the fall and following spring, they are ready for transplanting or sale. The mode of preparing the ground for them is precisely that with us of the Indian corn crop—the earth is well ploughed, and from thirty to forty bushels of lime are spread upon it to the acre. The trees of like kinds, for the convenience of picking, are then set out in rows at distances varying from twenty to thirty feet apart, according to the strength of the soil; a crop of corn is then put in and cultivated in the usual way, and this is done successively for *three years*; by this time the trees begin to bear. The cultivation of the corn being the proper tillage for the trees, and this crop amply paying for all investment in trees, &c. After the trees commence bearing, no other crop of any kind should ever be grown among them, as I have known two rows of potatoes between a row of peach trees not only to affect the fruit, but seriously to injure the trees; but they should be regularly ploughed some three or four times in the season, just as if the corn crop was continued. So obnoxious in our country is the peach tree to the worm, or borer—the *ageria exitiosa*—that each tree in the orchard should be examined twice a year, summer and fall—say in June and October—by removing the earth down to the roots, and killing with a pruning-knife every intruder—then scraping the injured bark and removing the glue. Thus exposed, they should be left for a few days, when the earth should again be replaced with a hoe. The limbs should be only moderately pruned or thinned out, so as to admit the sun and air, avoiding in the operation leaving *forks*, which incline them to split when burthened with fruit.

When the peaches ripen, they should be carefully picked from step-ladders, seven to eight feet high, into small hand-baskets, holding one peck each. Our operators for this purpose are both men and women, who earn from fifty to seventy-five cents a day, besides being *found*. These baskets are gently emptied into the regular market baskets, which are all marked with the owner's name and strewed along the whole line of orchard to be picked. As these are filled they are put into spring wagons, holding from thirty to sixty baskets, and taken to the wharf, or landing, where there is a house, shed or awning, for the purpose of *assorting them*, each kind by itself, which is into prime and cullings—the prime being distinguished not only by their size and selection, but also by a handful of peach leaves scattered through the top. They are then put on board the boats in tiers, separated by boards between, to keep them from injury, and so reach their destined market. We consider a water communication from the orchards, or as near as may be, most essential, as all land carriage more or less bruises or destroys the fruit. Our roads through the orchards and to the landings are all kept ploughed and harrowed down smooth and even. The baskets for marketing the peaches are generally obtained in New Jersey at twenty-five to thirty-seven dollars and fifty cents per hundred. With trifling modifications our culture and practice may be made to suit not only the Southern but the South-Western States. I may here, perhaps, properly remark, that the average life of our trees is from nine to twelve years, when properly cared for and protected as I have described; that the two great and devastating enemies the trees have to contend against are the *peach worm* and the *yellow*s; the first readily yielding to the *knife* and the treatment of semi-annual examination; the latter being a *constitutional, consumptive, or marasmatic disease*, for which no other remedy is as yet known or to be practiced but *extirpation and destruction*. There are *many theories* and *some practice* recorded on this, by far the most destructive enemy of the peach tree. I may hereafter give my own views on this particular and obscure disease. I concur, however, with Mr. Downing, of Newburg, that the

great and prevailing disposition of the peach tree in our climate is to over production of fruit in favourable seasons. Our remedy for this is carefully to thin it off by plucking all those that touch, or are within two or three inches of each other, when the size of hickory nuts, which are thrown into some running stream or into the hog-pens to be devoured. This mode 'of heading in,' or pruning one half of the producing buds, is new to me, but which I have just tried upon my garden trees in the city, and will be able to speak of *experimentally*, hereafter. With us in Delaware, as everywhere else, the peach tree *succeeds best in a good soil*. That preferred is a rich sandy loam, with clay. Many of my finest trees and choicest fruits are grown in a loose and stony soil. The trees should never be set out in wet, low, or springy situations, and for the same reasons, high and rolling ground should be selected for your plantations, and for the additional circumstance that they are less obnoxious to early frosts."

Wall-Culture. English Method.—*Borders* should never be deeper than eighteen or twenty inches for the peach, and six feet wide. Soil chopped turfy loam from a rich pasture, rather more clayey than light—beneath a good drainage, at least one foot deep, made of broken bricks and stones, with an outfall into a neighbouring ditch.

Planting.—Two year old plants are to be preferred, and planted as soon as the leaves begin to fall at the end of October. The best aspects are south and south-east. Plant, at the least, sixteen feet apart; the stem three inches from the wall, inclining towards it. Nail the branches to the wall, but do not prune them.

Summer Pruning is of far more importance than that of the winter.

"In May and June, and occasionally in the succeeding months, it is necessary to regulate the shoots of the same year, and to prevent improper growths by disbudding. Pinch off fore right buds or shoots; and pinch off or cut out ill-placed, very weakly, spongy, and deformed shoots, retaining a plentiful supply of good lateral shoots in all parts of the tree, and leaving a leader to each branch.

"Let them mostly be trained in at full length, all summer, about three

inches asunder, for next year's bearers; and divest them of any lateral twigs to prevent a thicket-like intricacy, and to promote a healthy fruitful growth in the shoots themselves. In the course of the summer regulation, if any partial vacancy occurs, or should a young tree under training want an additional supply of wood, shorten some conveniently placed strong shoot, in June, to a few eyes to furnish a supply of laterals the same season."—*Abercrombie*.

This disbudding and regulation should be done by degrees. If many shoots and leaves are removed suddenly, it occasions gumming, and over-luxuriance in the shoots that remain. If shoots are very strong, train them as nearly perpendicular as is admissible, that there may be no check to the sap's return. Shoots less robust train horizontally.

Protect from frosts whilst in blossom; and, when the fruit is well set, syringe three times a week with water to which half a pint of ammoniacal liquor, from gas-works, has been added to each gallon. This will destroy all insects, and especially the aphid, and prevent the occurrence of mildew.

"*Winter Pruning* may be performed at the fall of the leaf, and thence, according to some professional writers, at any time in mild weather until spring. It should be completed in February or early in March, before the blossom-buds are considerably advanced, which are distinguishable by being round, plump, and prominent, while the leaf and shoot-buds are oblong and narrow. Retain, in all parts of the tree, a competent supply of such regular grown shoots of last year as are apparently fruitful in blossom-buds. Most part of these should be shortened, not indiscriminately, but according to their strength and situation; the very strong shoots should be left longer, being topped about one-fourth or one-third. Shoots of middling vigour reduce one-third or one-half; and prune the very weak to two or three buds. Always cut at a shoot-bud to advance for a leader. Sometimes a shoot-bud lies between a twin blossom-bud; cut half an inch above the bud. As many new shoots as will lie from three to six inches asunder may be deemed a competent supply: remove or reduce some part of the former bearers. Cut out

quite close the redundant, irregular, and other improper shoots: remove or reduce some parts of the former bearers of the two preceding years, cutting the most naked quite away, and others down to the most eligible young branch or well-placed shoot. Also take out all diseased and dead wood, retaining young where necessary to fill a vacuity."—*Abercrombie*.

The most systematic mode of preserving a constant supply of young wood is that proposed by Mr. Seymour, and described as follows in the *Gardener's Magazine*:—

"A maiden plant must be cut down to three eyes, *a*, and three shoots being produced, the two lower ones are left at full length, and the succeeding spring the centre shoot is again cut down to three eyes. At the time of disbudding the trees all the buds on the lower side of the two horizontal branches are rubbed off, and buds are left on the upper side of the branches at a distance of from nine to twelve inches from each other. These are suffered to grow five or six inches, and are then stopped; but still suffering the leading shoot to extend itself. At the second spring pruning, the centre shoot is again cut to three eyes; or, if the tree be very vigorous, five eyes may be left, two for each side, and a centre one for again furnishing leading shoots. The leading shoots are laid in the fan form, nine or ten inches from each other. The shoots on the leading branch are nailed to the wall in summer; but after the winter's pruning they are tied to the leading shoots to be nailed in, where they get well ripened, and mature their buds for another crop. At the winter's pruning they are cut to three or four inches, according to their strength. The maiden plant, being headed down the first winter, will present two laterals, *b*. The second year, at the end of

Fig. 106.

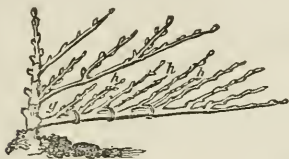


summer, there will be four side-shoots, and six or more laterals, *c*. In the ful-

lowing spring pruning, the laterals, *d*, which had been nailed to the wall, are loosened and tied to their main shoot, *e*, and the upright shoot shortened to three buds, as before.

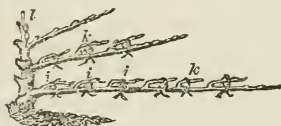
"At the end of the third summer the laterals will be doubled on the old wood by one having sprung from the base of the shoot tied in, *g*, and another from its extremity, *h*. In the pruning of the

Fig. 107.



following spring the laterals of two years' growth, which had borne fruit, are cut off close, and the young laterals which had sprung from their base, *i*, are loosened from the wall, and tied

Fig. 108.



down to succeed them; the other laterals, *k*, are tied in, and the upright shoot shortened, *l*, as before.

"Now, or before, the side shoots will have to be headed down once or even twice, so as to increase their number, and regularly cover the wall. The extent to which this practice is carried will depend on the height of the wall, and the distance of the trees from each other; the ultimate object being to produce a fan form, as regular as possible, of permanent wood, with no young wood thereon, besides what is produced along the spokes of the fan, on their upper side, at about twelve inches apart, and the prolongation of the shoots.

"In the course of the winter or spring of the third year, I shorten the side shoots to about ten or twelve inches, as may be most convenient for wood-buds, to get two principal leading shoots from

each side shoot; the first about three inches from the stem, as the bud may suit, and the other at the end of the shortened shoots, so as to double the leading shoots. The upright shoot is always cut at three of the lowest and most suitable buds, so that the stem may be kept as short as possible; for, unless the side shoots are multiplied, the stem gets too high. If the side shoots are strong the year after cutting down, they may be laid in their whole length; but if weak, they must be cut short to give them strength. Continue in this way to double the side shoots for two or three years, by which the tree will get strength, and then it will admit of the side shoot being shortened to about fourteen inches. Cut for two or three years, so as to produce three shoots upon each side shoot, and so continue until there is a sufficient number of leading shoots to furnish the wall.

"After the tree has got into a bearing state, cut the lateral shoots to about eight or nine inches, taking care to cut at a wood-bud; and at the time of dis-budding leave the best situated buds, and those nearest the base, for the future year's bearing."—*Gard. Mag.*

Thinning.—Let there be a space of nine inches between every brace of fruit upon the weaker shoots, and six inches on the stronger. See *Thinning*.

Blistering of the Leaf.—This disease, which is called by some gardeners the *Bladder Blight*, and by the French *la cloque*, is occasioned by more moisture being forced into the leaves from the roots than they can evacuate by expiration. Some gardeners, annotating upon this opinion, expressed by the present writer in the *Gardener's Chronicle* in June, 1845, have concluded, because the blistering appears more abundantly when cold nights succeed to hot days, that they occasion the disorder; but they are only the proximate cause; those cold nights reduce the expiratory power of the leaves, whilst the roots in a soil of un-reduced temperature continue to imbibe moisture, and to propel it to the leaves with undiminished force. The blistering is, consequently, more extensive. That the force with which the sap is propelled, is quite sufficient to rupture the vessels in the parenchyma of the leaf, is evident from Dr. Hale's experiment. He found the vine propelled its sap with a force equal to a

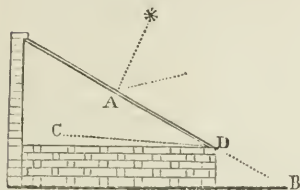
column of mercury fifteen inches high. There is no doubt upon my mind, that if the soil be well drained, and not too fertile, blistering will never occur. The remedy, therefore, is obvious in either case.

Diseases.—See *Aphis*, *Chermes*, *Honey Dew*, *Mildew*, *Extravasated Sap*.

Forcing. Any of the early varieties are suitable for this purpose; success does not depend so much on the kind, as on the management.

Form of House.—The best form for a Peach-house, is that thus described by the late T. E. Knight, Esq.

Fig. 109.



As the lights to be moved to the required extent with facility must necessarily be short, the back wall of the house must scarcely extend nine feet in height, and this height raises the rafters sufficiently high to permit the tallest person to walk with perfect convenience under them. The lights are divided in the middle at the point A, and the lower are made to slide down to the D, and the upper to the point A. The flue, or hot-water pipe enters on the east or west end, as most convenient, and passes within six inches of the east and west wall, but not within less than two feet of the low front wall, and it returns in a horizontal direction through the middle. The trees must be planted between the flue and the front wall, and the other row near the back wall, against which they are to be trained.

If early varieties be planted in the front, and the earliest where the flue first enters, these being trained immediately over the flue, and at a small distance above it, will ripen first; and if the lower lights be drawn down in fine weather to the point B, every part of the fruit on the trees which are trained nearly horizontally along the dotted

line c, will receive the full influence of the sun. The upper lights must be moved as usual by cords and pulleys, and if these be let down to the point A, after the fruit in the front tree is gathered, every part of the trees on the back wall will be fully exposed to the sun, at any period of the spring and summer after the middle of April, without the intervention of the glass. A single fireplace will be sufficient for a house fifty feet long, and I believe the foregoing plan and dimensions will be found to combine more advantage than can ever be obtained in a higher or wider house. Both the walls and flue must stand on arches, to permit the roots of the trees to extend themselves in every direction beyond the limits of the walls, for whatever be the more remote causes of mildew, the immediate cause generally appears to be want of moisture or dampness above it. A bar of wood must extend from D to B, opposite the middle of each lower light, to support it when drawn down.—*Knight's Select Papers.*

The soil, culture, and pruning are the same as required for those trees grown on walls.

Forcing in Pots is a very excellent mode, and enables the Peach to be thus grown in establishments where there is no regular Peach-house. Pot a three year old tree in a twelve inch pot, cutting it back to four buds; and shift every year until it has attained an eighteen inch pot, a size which need never be exceeded. Let the soil be turfy, and mixed with decaying wood from the bottom of an old wood stock.

Commencing forcing and temperature. The best and most successful directions on these points are the following, given by Mr. W. Hutchinson, gardener at Eington Park. He says:—"Bring the trees into the house in mild weather during November, a little earlier or later according to the state of the weather; do not start them all, however, at once; the last lot are not put in until the first of January. Any later than this would not answer, as the weather, if clear, is then hot through the day. Commence forcing them at 55° at night, allowing the thermometer to fall to 50° in the morning, if cold, but if the weather is mild, never to fall below 55°; and from that to 60° is the

usual temperature kept up throughout the period of forcing during the night; during the day, I make up for low night temperature, when I have the chance, by sun heat. Do not be fastidious about a few degrees: to get it high enough is the main point, say from 70° to 85° and 90°, until the fruit is stoned, then keep them very hot during the day, viz. from 95° to 105°, and sometimes even as high as 110°. Of course a great deal of moisture is required with this high temperature: syringe over head twice a day, and sometimes oftener when the air is dry, and you will scarcely ever be troubled with either green fly or red spider. Watering at the root must be carefully attended to; very little is wanted until the trees get covered with leaves; but after the fruit is stoned they should be watered plentifully. Of course the watering must be gradually withdrawn as the fruit approaches maturity, in order to increase their flavour.”—*Gard. Chron.*

When the blossoms are well open, impregnation should be assisted by the aid of a camel's hair pencil.

One essential for securing vigorous production in the Peach-house is to have the roots of the trees well nourished. If these are not duly supplied with moisture, and food during the time the fruit is setting and swelling, a fail-

ure of the crop is inevitable. To secure such a supply, it is a most effectual treatment to give the border a top-dressing, at the close of February, of charred turf. Liquid manure and water, of course, must be given also, as the dryness of the soil and appearance of the trees indicate are necessary.

Standards.—In Essex, I have grown the peach successfully, both as a standard and as an espalier, in a garden sloping to the south, and well protected from the east and strong westerly winds.

PEAR. *Pyrus communis.* Of this fruit four hundred and forty-two varieties are at present cultivated in the Chiswick Gardens, and these with many more are described in the Horticultural Society's Fruit Catalogue.

The subjoined list, taken from the catalogue of D. Landreth and Fulton at the old Landreth nurseries comprises a selection of choice and approved varieties, abstracted from the mass in cultivation, the larger number of which are only calculated to disappoint those who rely on them—either by reason of the inferiority of the fruit, or want of adaptation to our climate—the latter to a very considerable extent; how else can we account for the quality of their product here, compared with their transatlantic character?

EXPLANATION OF ABBREVIATIONS.—*Colour*—g green; y yellow; rus russet; r red; b brown. *Size*—L large; M medium; s small. *Form*—obov obovate; pyr pyramidal.

*Those marked * are of American origin.*

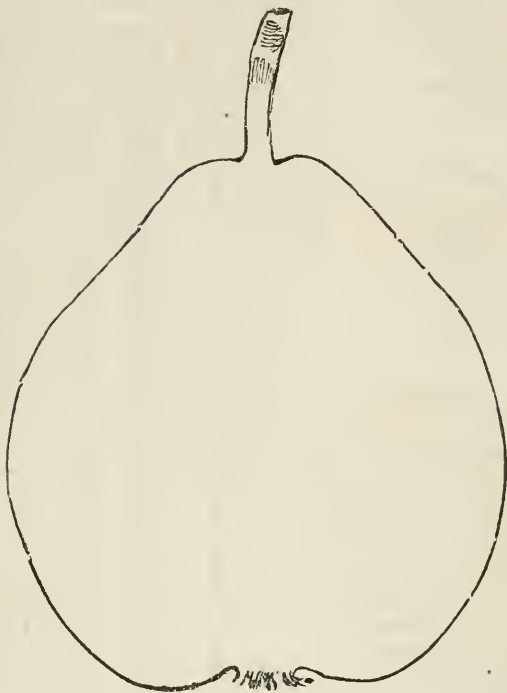
NAME.	COLOUR.	FORM.	SIZE.	QTY.	SEASON.
Althorpe Crassanne	g	obov	M	1	Oct. to Nov.
Bartlett	g y	pyr	L	1	Aug. Sept.
Bell Pear	g	pyr	L	2	Sept. Mar.
Bergamot, <i>Hampden's</i>	rus	round	M	2	Aug. Sept.
*Bergamot, Autumn	rus	round	M	1	Sept. Oct.
Bergamotte, Suisse	y r	pyr	M	2	Oct. Nov.
Bergamotte, Easter	g	obov	M	1	Mar. Apl.
Bezi de Lamotte	y	round	M	1	Oct. Nov.
*Bleeker's Meadow	g y	round	M	1	Oct. Dec.
*Bloodgood	y rus	obov	M	1	Aug. Sept.
Beurré de Roi	y	pyr	L	1	Sept. Oct.
“ Diel	y	obov	L	1	Sept. Dec.
“ de Capiaumont	b	obov	M	1	Sept. Oct.
“ d'Amalis	b	obov	L	1	Sept. Oct.

NAME.	CO- LOUR.	FORM.	SIZE. QTY.	SEASON.
Beurré Bosc	b	pyr	L 1	Sept. Oct.
" Summer	y	obov	M 1	July Aug.
" d'Arenberg	y	obov	L 1	Dec. Jan.
" Easter	g	obov	L 1	Oct. Mar.
" de Ranz	g	pyr	L 1	Feb. Apl.
Buffum	y	obov	M 1	Sept. Oct.
*Chapman, <i>Carr's</i>	g y	obov	M 1	Sept. Nov.
Chaumontelle	y	pyr	L 1	Nov. Feb.
Columbia	y	obov	L 1	Nov. Jan.
Compte de Lamay	y	obov	M 1	Sept. Oct.
Dearborn's Seedling	y	obov	M 1	Aug. Sept.
Dix	y	pyr	L 1	Oct. Nov.
Doyenné Gris	rus	pyr	M 1	Sept. Oct.
Duchess d'Angoulême	y	obov	L 1	Oct. Nov.
Early Catharine	y	pyr	S 2	July Aug.
Flemish Beauty	y	obov	L 1	Sept. Oct.
Fondante d'Automne	y	obov	M 1	Sept. Oct.
Forelle	y	pyr	L 1	Nov. Jan.
Frederick of Wirtemberg	y	pyr	L 1	Sept. Oct.
Gloux Moreeau	g	pyr	L 1	Nov. Dec.
Green Chisel	g	obov	L 2	Aug. Sept.
*Haddington, <i>Smith's</i>	g y	obov	L 1	Sept. Oct.
*Harvard	rus	obov	M 1	Sept. Oct.
*Heathcote	y	obov	M 1	Sept. Oct.
Holland Green	g	obov	L 1	Oct. Dec.
La Bon Cure	y	pyr	L 1	Sept. Oct.
L'Echasserie	g	round	M 1	Nov. Mar.
*Lewis	g	obov	M 1	Oct. Jan.
Leon Le Clerc— <i>Van Mons</i>	y	pyr	L 1	Oct. Nov.
*Lodge	rus	pyr	S 1	Oct. Dec.
Long Green Mouthwater	g	pyr	L 1	Aug. Sept.
Louise Bonne de Jersey	g	pyr	L 1	Sept. Oct.
Madeline	g	obov	M 1	July Aug.
Marie Louise	y	pyr	L 1	Sept. Oct.
Muscat Allemande	g	obov	L 1	Nov. Feb.
Passe-Colmar	y	pyr	L 1	Nov. Jan.
*Pennsylvania	g	obov	L 1	Sept. Oct.
*Petrè	y	pyr	L 1	Sept. Oct.
Rousselet de Rheims	rus	pyr	L 1	Oct. Nov.
*Rushmore	y	obov	M 1	Sept. Oct.
*Seckel	rus	obov	S 1	Sept. Oct.
Stephen's Genessee	y	obov	M 1	Oct. Nov.
St. Germaine, <i>Uvedale's</i>	rus	pyr	L 1	Nov. Apl.
*St. Germaine, <i>Prince's</i>	rus	obov	L 1	Nov. Jan.
St. Ghislan	y	pyr	M 1	Oct. Nov.
Sugar	y	pyr	L 1	Aug. Sept.
Surpass Virgalieu	y	obov	L 1	Oct. Nov.
Swan's Egg	g	obov	M 1	Oct. Nov.
Urbaniste	g	obov	M 1	Oct. Nov.
*Washington	y	obov	M 1	Aug. Sept.
Winter Nelis	g	obov	M 1	Dec. Feb.

The annexed outlines and descriptions of a few prominent varieties will doubtless interest those who may not have access to a work especially devoted to fruits. The descriptions

have been made as concise as practicable, consistent with perspicuity. For further information, see Cox, Kenrick, Downing—American pomologists.

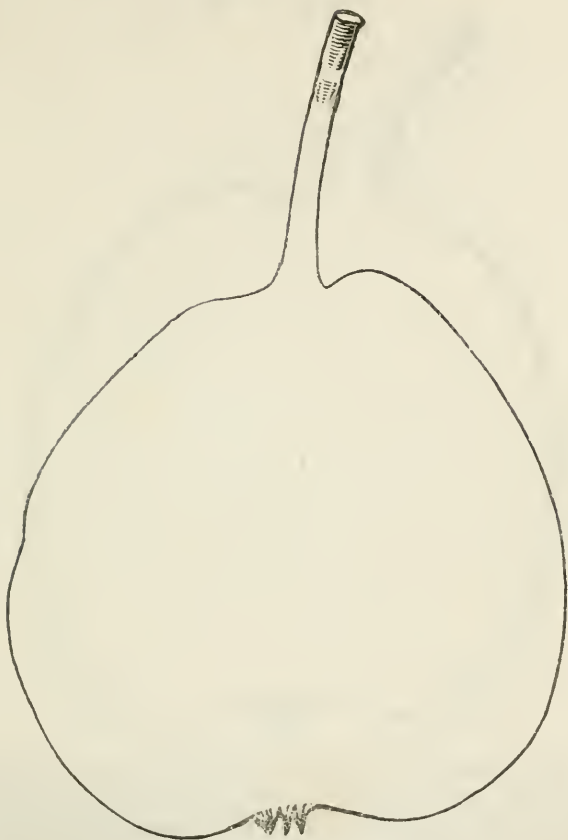
Fig. 110.



HADDINGTON. (*Smith's.*) (Fig. 110.) We have by the merest chance this excellent addition to our stock of winter pears. Mr. J. B. Smith, when on his farm near Haddington, Philadelphia County, in 1828, reared from the seed of the pound pear, a number of young plants for stocks. This one accidentally remained unworked, and on Mr. Smith's removal to the city, was brought by him and planted in his garden, where it now stands, singularly erect, and with few horizontal branches. It comes into use in December, and keeps through winter; the skin is green, when ripe slightly yellow on the sunny side, and marked by minute russet dots or specks. The texture of the fruit varies; some are quite melting, others incline to break—it never cracks, bears abundantly, and we conceive it quite an acquisition to our winter pears.

PENNSYLVANIA. (*Smith's.*) (Fig. 111.) This, so named by the Pennsylvania Horticultural Society, is a seedling on the grounds of Mr. J. B. Smith, Philadelphia. The original tree is 35 to 40 feet high, pyramidal in form, of robust habit, retaining its foliage unusually late. Its origin and age are unknown, but this and the Moyamensing (subsequently described) standing in the same garden, have recently been recognized by an aged lady, who knew these identical trees when a child. The fruit in outline and general appearance somewhat resembles the old *Beurré*—prevailing colour, brownish yellow, occasionally speckled and burnished with brighter yellow on the upper portion, the lower or blossom end presenting a uniform dull brown or russet hue, the sunny side dotted with red. Stem deep brown an inch and a quarter long,

Fig. 111.—(P. 432.)

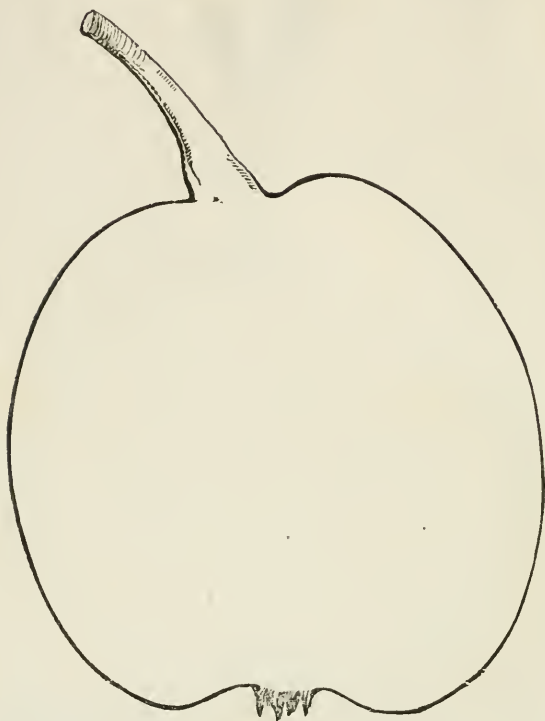


standing nearly erect, planted on a full crown; in some specimens one shoulder more elevated than the other. Calyx small, in a shallow basin. Flesh yellowish white, rather coarse grained, and somewhat gritty; flavour not unlike the butter. Ripe, 10th August to middle September. It is a fine bearer, never cracks, and may be classed among the good American pears.

MOYAMENSING. (*Smith's Early Butter.*) (Fig. 112.) This is supposed to be a native. It stands in the garden of Mr. J. B. Smith, Philadelphia, is

thirty feet high, open in growth, and uniformly sheds its leaves early in August. The fruit vary in shape—some are roundish, others obovate: colour, a uniform light yellow. Stem an inch long, in some specimens set in a shallow basin, in others rising from the crown with a fleshy and enlarged base. Calyx rather prominent, in a shallow plaited cup. Ripe from middle July to close of August. The texture is buttery, so much like a *Beurré* as to have received the above synonym. It is a desirable variety.

Fig. 112.—(P. 433.)



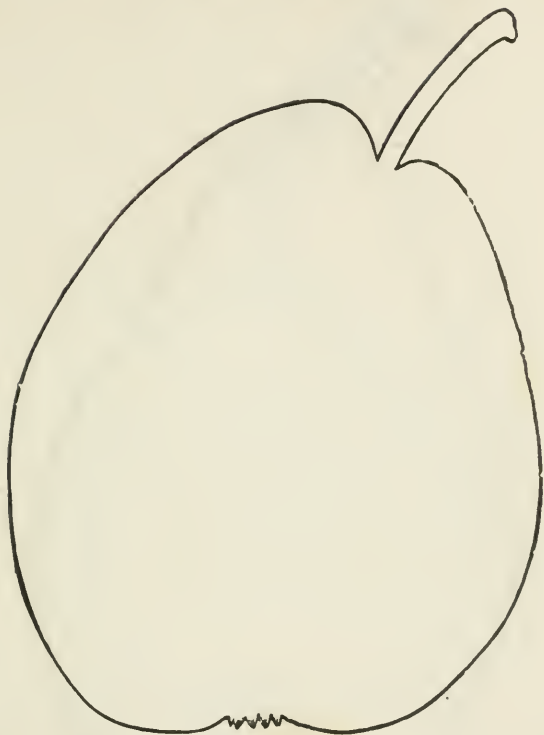
COLUMBIA. (*Bloodgood. Downing.*) (Fig. 113.) An American, as its name implies, produced in West Chester County, New York, where the original tree still exists. This is truly a valuable variety, in season when most needed—from November to January. Stem an inch long, curved. Calyx comparatively small. Skin, when fully ripe, of a rich golden hue. Flesh whitish, rich and aromatic—worthy of general culture.

ST. GERMAIN of *French and English Authors.* (Fig. 114.) There are but few winter pears of finer quality than this old favourite; and were it not particularly liable to fire-blight, none would be more cultivated. The outline is frequently quite irregular, but in all specimens full at the blossom end, narrow-

ing towards the stem. The skin is thick, and green even when fully ripe. Stem short and obliquely planted. Calyx set in a shallow basin. Flesh white, and when in perfection, abounding in juice of exquisite flavour. Ripe from December to March.

LEWIS. (Fig. 115.) This variety derives its name from Mr. John Lewis of Massachusetts, on whose farm it originated thirty years ago. It is in season from November to February, and may be enumerated among our valuable winter fruits. It bears most profusely and, though not externally attractive, the skin being rough, would doubtless be highly profitable if cultivated for city sale. Outline nearly round, a little flattened at the crown. Skin green. Stalk an inch and a

Fig. 113.—(P. 434.)



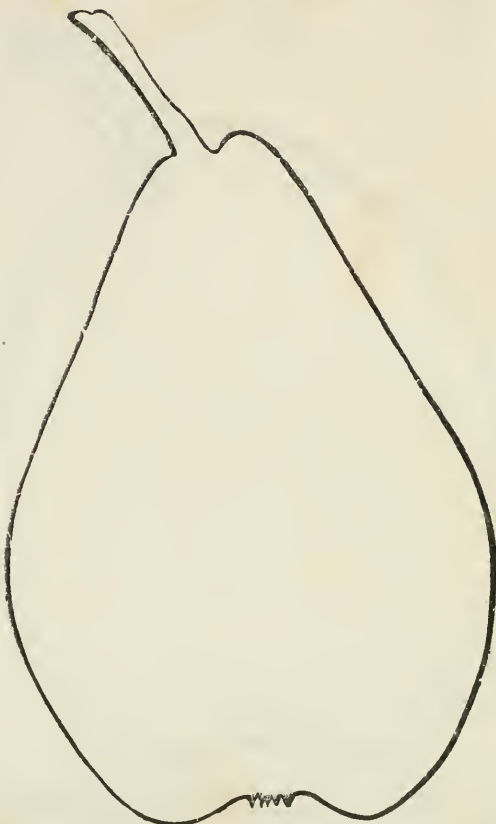
half long, calyx large and open, basin very slightly furrowed. The quality of the fruit, though not "first rate," is such as with its constitution and productive habit must insure this variety extensive cultivation.

BEURRE DE RANZ, of *Thompson*. **BEURRE RANCE**, of *Lindley*. (Fig. 116.) This is a Flemish pear, and obtains its name of Ranz from the district in which it originated. It is one of the longest keepers, not being in perfection until spring. Few pears have received more unqualified praise both here and in Europe. The outline is pyriform or pear-shaped. Skin coarse and always green, with brownish dots. Stem upwards of an inch long. Eye quite minute and but

little depressed. Flesh melting, abounding in rich and highly flavoured juice.

BEURRE DIEI, of *Thompson*, *Lindley*, and others. (Fig. 117.) "This variety, known by a dozen different names, of which that above is most generally used, and should be alone, is one of the many excellent seedlings of Van Mons, and named by him after Doctor Diel, a conspicuous amateur fruit cultivator. It has few superiors in its season, September to November (or even December in some climes). We sometimes see specimens much larger than our drawing, and with less elevation of shoulder, but the sketch affords a fair idea of its average size and appearance. Its habit is ro-

Fig. 114.—(P. 434.)

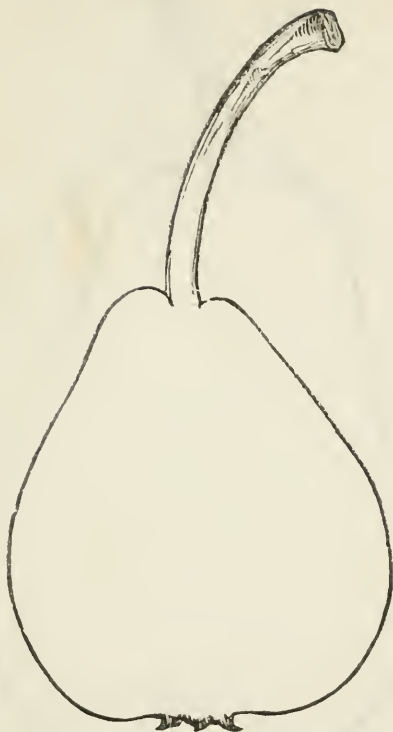


bust, and rather peculiar, from the turning or twisting of its branches. Color varying from light to dark yellow, blended and dotted with brown. Skin thick. Stalk an inch or more in length, bold and curved. Eye set in a shallow basin. Flesh yellowish white, rich and buttery. On trees in vigorous growth and heavy land the fruit is sometimes rather coarse-grained, and slightly astringent.”—*Rural Reg.*

BARTLETT PEAR, *of the Americans*.—WILLIAM’S BONCHRETIEN, *of the English*. (Fig. 118.) “This truly admirable variety is of British origin, first

brought into notice by one Williams, whose name it bears. Many years ago, (1799, according to Downing,) it was imported into Massachusetts by Mr. Enoch Bartlett, from whose grounds, near Boston, it was widely disseminated; hence the name by which it is known among us. The habit of the tree is thrifty and erect, the shoots strong and vigorous. The fruit is large, quite irregular in outline, and varying considerably in different specimens. Skin smooth, yellow, with a slight blush on those which have ripened in the sun, on others entirely destitute of

Fig. 115.—(P. 434.)



red. Stalk about an inch in length, one shoulder more prominent than the other; calyx placed in a slightly formed cavity. The flesh is white, and combines with a delightful aroma, all the good qualities of the old well-known Beurré or Butter Pear.

"Ripe middle of August to close of September."—*Rural Reg.*

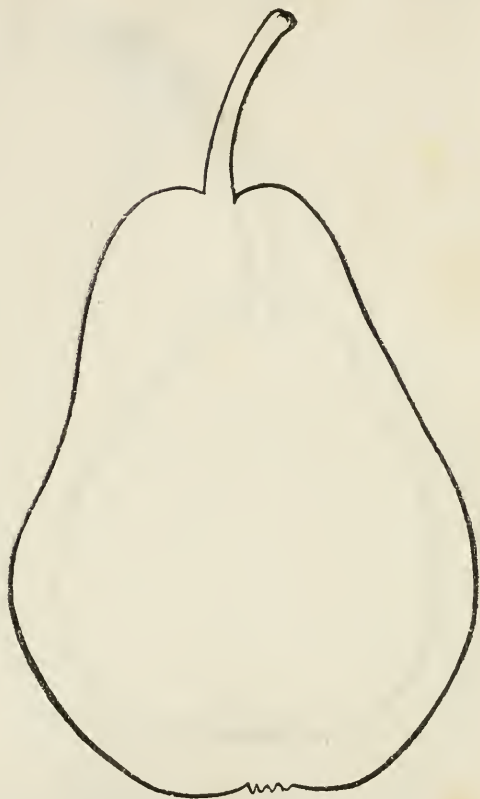
BEZI DE LA MOTTE. (Fig. 119.)

"This is a pretty widely known French Pear, and is well worthy of perpetuity, even though not decidedly in the first class. Its habit is robust, yields fruit freely, which keeps well; the flavour is aromatic, texture buttery. Its outline is roundish—flattened; the stem under an inch in length. Calyx va-

riously placed, in some specimens the basin is shallow and the curvature regular, in others quite irregular. Skin, green, in well-ripened specimens yellowish, and spotted with brown dots. Ripe in October.—*Rural Reg.*

WASHINGTON. (Fig. 120.) "We have elsewhere expressed our regret that foreign fruits of doubtful worth, should have been cherished and disseminated, to the neglect of unquestionably fine varieties of native origin. The Washington Pear is a seedling, discovered in a hedge-row on the estate of the late Col. Robinson, near Naaman's Creek, Delaware, some forty-eight or fifty years ago. We are informed by our friend Dr. Thomp-

Fig. 116.—(P. 435.)

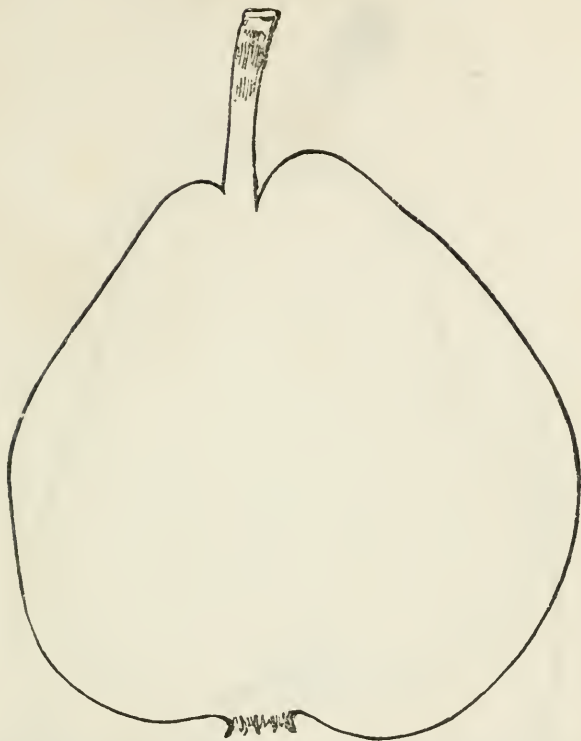


son of Wilmington, that the tree still stands vigorous and healthy, producing from fourteen to sixteen bushels of fruit annually. Doct. T. says, 'so far as my recollection of it goes, it has never suffered from disease or been attacked by blight, and I have never known the fruit of the original tree, or one of its descendants by budding or grafting to crack, as does the fruit of the old Beurré or Butter.' Doct. T. adds, 'Delaware has some state pride in this pear, quite as much as Pennsylvania has in her fine Seckel, than both of which I have yet to see their superiors among the autumn pears.' In the

opinion of some competent judges he might have gone a little further and said, their equals; and yet from some unaccountable cause, the Washington is comparatively unknown. Coxe does not even name it in his 'view of the cultivation of fruits' published in 1817, and Kenrick from the notice of it in his 'Orchardist' had evidently never seen it. Downing has several typographical errors in his description; that portion destined to be history, should be amended in his next edition.

"The outline is not unlike that of the old Butter, Virgalieu or St. Michael, as it is indifferently called, but rather

Fig. 117.—(P. 435.)



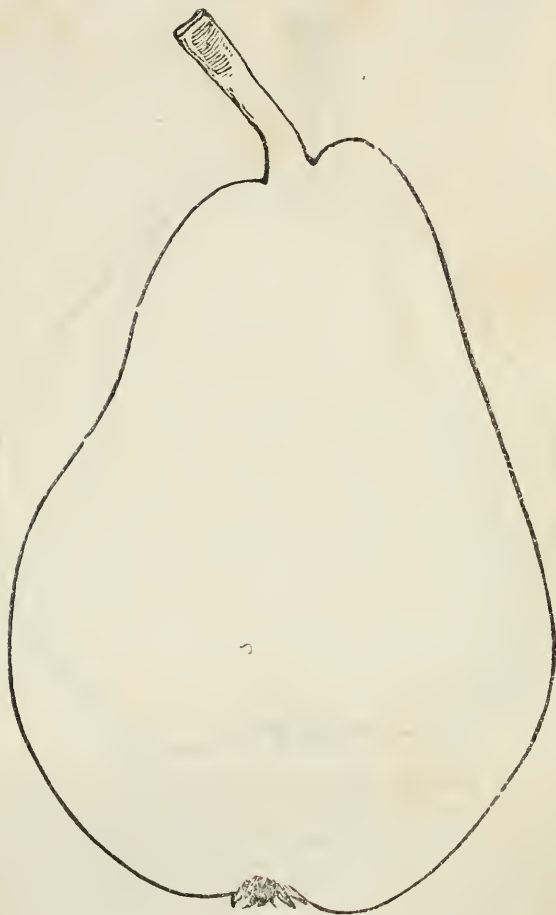
narrower, and in several particulars very closely resembles that famous pear; alas! now in its decadence. It is of medium size, uniformly oval. Skin smooth, yellow, and not unfrequently with a ruddy cheek. Stalk an inch or more in length, usually placed on a full crown. Eye, quite small, seated in a slight indentation; texture that of the Beurré, and exquisitely delicious. Ripe in August (or two or three weeks before the Butter), and continues in season until September."—*Rural Reg.*

COMPTE DE LAMY—(Fig. 121)—Is a Flemish Seedling of late introduction, and thus far promises to be entitled to our regard; much more so than a majority of recent importations. There appears to be an unusual diversity in the form or

outline of this fruit. Some specimens are roundish, with the stem inserted obliquely; in others, as in the drawing, on an elevated, irregularly tapering crown. We have seen them so diverse in appearance, as to be scarcely recognized as the same variety. Skin yellow, marked on the sunny side by brownish or russet specks. Stalk an inch or more in length, in some nearly straight, in others curved. Eye of medium size, very slightly indented. Flesh white, buttery, sweet and aromatic. In season September and October.

BEURRE D'AREMBERG, of *French and English works*. (Fig. 122.)—This Pear, though comparatively little known in the United States, has reached us with a high European reputation, and

Fig. 118.—(P. 436.)

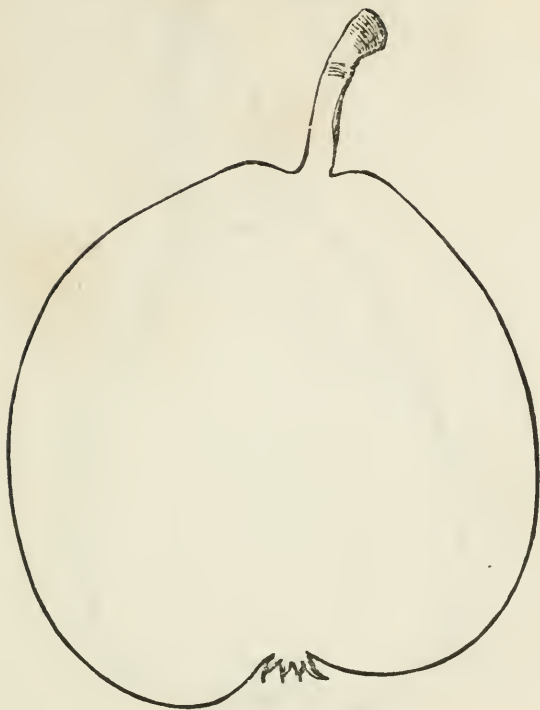


as both the English and French concur in its praise, it may be safely assumed to be worthy of culture. It was raised by the Abbe Deschamps, in the garden of the Hospice des Orphelins, and has been distributed under several names, as Beurré Deschamps, Duc D'Arenburg, &c. The fruit is large, narrowing towards the crown. Skin pale, or yellowish green, dotted with russet, which

grows brighter at maturity. Calyx comparatively small, deeply planted. Flesh white, very juicy, and unusually high flavoured. In season from mid-winter to spring.

PETRE. (Fig. 123.) "One of the many good fruits of American origin, comparatively unknown; whilst foreign varieties of less worth have been lauded and disseminated. The parent still exists, in

Fig. 119.—(P. 437.)

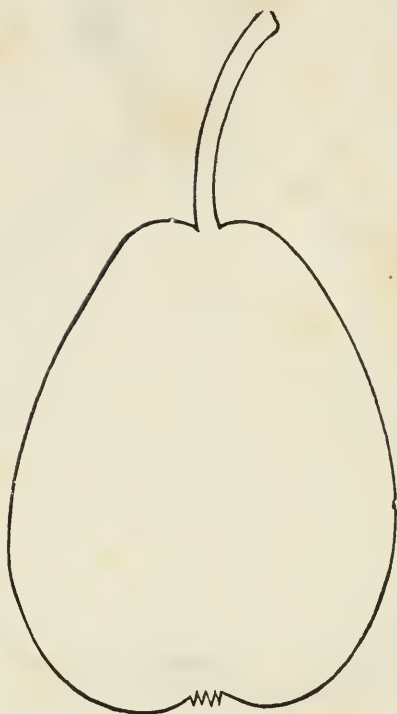


"green old age," at the Bartram Garden, on the Schuylkill, three miles from Philadelphia. It is the product of seed contributed by Lord Petrè to the venerable Bartram in 1735. We have frequently heard Mr. Carr, a connection of the Bartram family, and present owner of the grounds, relate its history; a pleasing incident in which, was the presentation to Lord P. after the lapse of a quarter of a century, of fruit, the product of the identical seed he had contributed. We do not think this pear should be placed in the first class, yet award it high praise, and advise its extensive culture. The flesh is buttery, aromatic, and closely resembles its parent the *Beurré*, or *Butter*. Fruit of medium size, yellow, occasionally slightly marked by russet dots. Stem an

inch long, planted in some specimens between elevated shoulders. Eye set in a shallow basin. Ripe close of September, and admits of being kept several weeks."—*Rural Reg.*

PASSE COLMAR. Lind.: Thomp.: and others. (Fig. 125.) For this, as well as some other important varieties, we are indebted to Hardenpont of Belgium. It is in eating during winter, and as our resources at that season are limited, is additionally valuable. There is considerable variation in its outline. The skin coarse, yellowish when ripe, marked by minute russet dots. Stem prominent, an inch or more in length, inserted between elevated shoulders in many specimens, in others with little or no peculiarity of that kind. The flesh is melting, abounding with rich aro-

Fig. 120.—(P. 437.)



matic juice. On the whole this pear has few superiors in its season, and is deservedly a favourite.

Propagation.—*By Seed*, to obtain varieties, is best practised by following the directions for raising seedling *Apples*. For raising grafting stocks, the seeds of the wild pear should be employed, the produce being hardy.

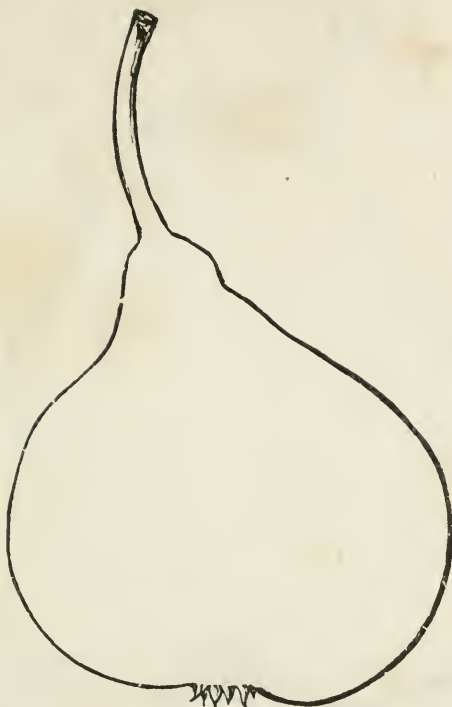
Grafting and Budding.—Mr. Loudon has collected together the following good directions upon these subjects:—

“The most common stocks for grafting the pear, are the common pear and the wilding; but as the apple, is dwarfed and brought more early into a bearing state by grafting on the pawell, on the white beam, medlar, service, or apple; but the wilding and quince are in most general use. Pears, on free stocks,

grow luxuriantly in good soil on a dry bottom; those on wildings grow less rapidly, but are deemed more durable, and they will thrive on the poorest soil, if a hardy variety and not over pruned.”

“On the quince,” Miller observes, “breaking pears are rendered gritty and stony; but the melting sorts are much improved; trees on these stocks may be planted in a moist soil with more success than those on wildings or thorns.” On the thorn, pears come very early into bearing, continue prolific, and, in respect to soil will thrive well on a strong clay, which is unsuitable both to those on quinces and wildings; and the grafts or buds require to be inserted very low that the moisture of the earth may tend to favour the swelling or enlargement of the diame-

Fig. 121.—(P. 439.)



ter of the stock, which does not increase proportionally to, nor ever attains the same size as the stem of the pear. Dubreuil, a French gardener, recommends the quince stock for clayey and light soils, and the free stock for chalky and siliceous soils.—*Enc. Gard.*

The suggestion of Mr. D. Montgomery, gardener to the duke of Montrose, is also worthy of adoption, viz., that by grafting the alternate branches of late pear-trees with early sorts, and early trees with late sorts, there are two chances of success, the early sort being very early in blossom; if that fails in consequence of unfavourable weather, the late sort, flowering at another time, may succeed. Farther, the early sort ripens off before much effort is required from the tree to support the late sort;

hence, each sort in its season is brought to greater maturity.—*Hort. Trans.*

Soil.—A dry loam, when the pear is grafted upon a pear stock; but moister, if grafted upon the quince, is suitable. Two feet depth of soil is required, and tiles should be placed beneath the young trees to prevent their rooting deeper. If this be attended to, and the soil be thoroughly underdrained, the subsoil is not of much consequence. A gravelly subsoil is to be preferred.

Pruning Standards is not often required, and when necessary it is only to remove crowded, diseased, and cross-growing branches. This may be done at any season, unless the branch to be removed is large, in which case it had better be amputated early in the spring, before the sap is in motion. Their

Fig. 122.—(P. 439.)



fruitfulness is increased if the branches are fastened down, so that their points are below the level of their bases.

The shoots of the current year are bent down when fully grown, about the end of July, and fixed in a pendent position by shreds of bass; in the course of the winter, these shreds are removed to admit of pruning, when the shoots are found to have taken a set; in the course of the summer, such as grow vigorously are again tied, the object being to check the vigour of the young shoots, and by impeding the return of the sap, to cause it to expend itself in these young shoots in the formation of blossom buds. — *Gard. Mag.* See *Quenouille*.

Culture of Wall Trees.—The following are the best directions that have

been given on this subject:—"Plant the trees against the wall, fifteen feet from each other. If they have three shoots properly placed, they may all be retained. If only one strong healthy shoot, in the spring the first tree is to be headed down within nine inches high, the next to that one foot nine inches, and so on alternately, till you get to the other end of the wall.

"In the summer, train three shoots from the three uppermost eyes of each tree, rubbing off all the rest. Nail in one to the right, one to the left, and the other perpendicularly. The two side branches should not be trained in a horizontal position till the second year. In the following winter, the centre shoot of each is to be cut off two feet above the first pair of lateral branches.

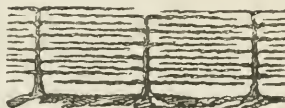
Fig. 123.—(P. 440.)



“In the next summer, the three top buds are to be trained one on each side, perfectly horizontal, and the middle one upright; should the centre this season grow vigorously, and advance two feet before the end of June, top it at that height with the thumb and finger. Three shoots may probably start from the three upper eyes; if so, nail them in an easy position, and bring them to their proper places in the winter pruning; but most probably only two will break. In this case, as soon as they are six inches long, train them both on the opposite side from which you wish a third shoot, and rather lower than the horizontal line; this will cause the next bud below the two shoots already obtained to start. As soon as this advances a few inches, restore the shoots from the top bud to an erect position, and the other about half the way between the horizontal and perpendicular line; observing, if one of the side shoots gets

the advantage of the other, to depress the strong or elevate the weak as occasion may require; by which means both will be kept of an equal length.

Fig. 124.



“If by the autumn the centre shoot has not advanced two feet, or if it does not appear to have ripened, cut the three summer shoots off within half an inch of the place from whence they sprang; there will then be an upright centre two feet above the second pair of horizontal branches, which will not fail to push vigorously the next spring, and although in this case only one pair of branches will be produced this sea-

Fig. 125.—(P. 441.)



son, the tree will be much benefited from having the upright shoot topped, as the sap by this check will be forced into the horizontal branches below, which are often starved by the prodigious and in a great measure useless growth of the centre. All superfluous shoots are to be pinched off within an inch or two as they appear, and, as far as may be, without leaving the branch absolutely bare, and entirely cut out in the winter pruning.

“This treatment is to be repeated till

those trees which have their first pair of horizontal branches within nine inches of the ground, arrive within two feet or eighteen inches of the top of the wall. These trees are to be considered permanent; those which have no branch till they are one foot nine inches high, are for a temporary purpose only, and they may have a pair of branches within four inches of the top of the wall.

“In ten years, we will suppose, on a twelve feet wall, most of the branches will reach twelve or thirteen feet from

the stem. The wall, therefore, presents somewhat the appearance of the following figure.

Fig. 126.



"Hitherto it is obvious, that as we have doubled the number of trees, and each tree has produced as many, or perhaps more branches than are capable of bearing fruit, and those owing to stopping the leader longer than usual; so we must up to this time have double, or more than double, the usual quantity of fruit.

"After the temporary trees are removed, the crops will be still larger. Riders would not have answered the same purpose, as they would have already interfered for the last two or three years with the principals, that is, on a wall not exceeding twelve feet; and on this plan the temporary trees are to be trained three or four years longer, during which time they may be expected to produce considerable crops. The extremities of the horizontal branch being now within a foot or two of the stem of the next tree, the management of the permanent trees is to be altered. Instead of pinching off all shoots as they appear, at every fifteen or eighteen inches all along the horizontal branches, retain a well-placed shoot in an easy slanting position upwards, towards the branches of the temporary trees. Next year continue to train them in the same direction; and, in order to give them more room, elevate the branches of the temporary trees six inches above the place they have hitherto occupied.

"The third year the shoots will most likely show blossom; the free bearing sorts will do so in two years; but it must be recollected, we are speaking exclusively of the shy bearers. If plenty of blossom appears, the temporary trees may now be taken up and planted in, otherwise they may remain another year. After the temporary trees are removed, the young shoots, which we will suppose are now fully furnished with blossom buds, may be trained in a direction sufficiently sloping

upwards for the terminal bud of each to be within four or five inches of the horizontal branch above.

"If they show a disposition to grow too strong, they may be deeply notched, or a ring may be made round such as require it, about the eighth of an inch wide. In either case, let it be close to the branch from which the shoots spring. As they become diseased or worn out, or have produced long spurs, train in a young shoot by the side of any it may be proper to displace, and after the second year cut the old one out. In case a tree, after it has filled the space allowed, continues very luxuriant in growth, recourse may be had to the usual methods of checking it, either by cutting the roots or sawing the stem half or two-thirds through, just below the surface of the ground, or deep notches may be made on each side with the chisel. A single tree may of course be treated according to this plan.

"The temporary trees, if taken up with care, will certainly grow, and be found very valuable; they may be either planted against another wall, or if of sufficiently hardy kinds, treated as espaliers, cutting off the two or three upper pairs of branches; in either case, young shoots are to be trained in between the old ones, as already directed for the permanent trees. Should you have a wall with an aspect not sufficiently good to ripen the fruit of these removed trees, or should they be of those kinds which will not come to perfection as espaliers, they will nevertheless still be valuable in this case. After they have been removed a twelvemonth, treat them according to Mr. Knight's mode of changing the sort; that is, leave the horizontals at very nearly the full length, but cut off all the spurs, leaving only bare poles at every twelve, fifteen, or eighteen inches, according to the growth of the sort you intend to introduce.

Fig. 127.



"On the upper side, all along the

branches, make a notch a little deeper than the bark; it may be done by two cuts with a sharp knife, the side nearest the trunk being perpendicular, the other sloping; the graft may then be introduced by the common mode of crown-grafting. Train the shoots from the grafts as before directed. In two years and a half most kinds will produce an abundant crop, and the trees will be very nearly as large as those on the wall from whence they were taken; thus having an advantage over young trees of at least ten years."—*Gard. Mag.*

In pruning pear trees, never cut off a shoot which can be laid to the wall; for by cutting off the foreright shoots you produce a succession of the same without a chance of producing fruit. By laying in these shoots, less wood is produced; and those buds either on the old wood, or any short spurs which otherwise would have produced only wood shoots, bear a succession of blossom.—*Gard. Chron.*

Impregnating the Blossom of Wall Trees.—Mr. Harrison truly observes, that "it is very usual to see healthy pear trees produce an abundance of bloom, but set a very small proportion of fruit: this is particularly the case with the tenderest kinds. The reason is in some cases from the stamina being destitute of farina; and in others, from the farina having been dispersed before the pistils had arrived at a proper state for its reception. To remedy this, as soon as the first blossoms have expanded, and the pistillum is in a proper state of maturity, impregnate six upon each corymb of blossom. The florets to choose for this operation are those situated nearest the origin of the spur; for when pears set naturally, it is very generally such florets. The time for this operation is calm, dry days, and, if possible, when the sun is not very hot upon the trees. Immediately afterwards give each tree about eighteen gallons of manure water, or soft pond water, at the roots. The trees should never be washed over the tops for a considerable time after this impregnation has been effected."—*Treat. on Fruit Trees.*

PEAT-EARTH. See *Bog Earth.*

PEAT-EARTH PLANTS. See *American Plants.*

PECTINARIA *articulata.* Stove

evergreen shrub. Cuttings in spring. Sandy loam and lime rubbish.

PEDICULARIS. Twenty-one species, chiefly, if not all, hardy herbaceous. Sandy light loam and peat.

PEGGING-DOWN is a process which has to be pursued annually, in arranging the lower branches of shrubs, &c., on flower borders. It is usually done with little hooked sticks; but Mr. Beaton, the scientific gardener at Shrubland Park, says,—“We take a handful of matting, and cut it into four-inch lengths; then divide each piece into three or four pieces; we double these pieces round the shoots, and fasten the ends of the matting in the soil with a small dibber, or with the fore finger. In this way a boy may train and tie down all the plants in a flower garden in less time than it would take to procure pegs for two or three beds, and the work is much neater than when done with the best pegs.”—*Gard. Chron.*

PELARGONIUM. Two hundred and fifty species. Chiefly green-house evergreens; but a few are herbaceous, and a still smaller number tuberous-rooted. The shrubby evergreens are increased by cuttings: new varieties from seed; and the tuberous-rooted from seed; and all will thrive in a mixture of light loam and leaf-mould. It is to the shrubby evergreens that we shall confine our attention, these being the most beautiful and most generally cultivated. They form a portion of that large family formerly known collectively as “Geraniums;” but modern botanists have divided these into three genera: *Pelargoniums*, having usually seven stamens, and unequal-sized petals; *Geraniums*, having ten stamens, and equal-sized petals; and *Erodiums*, having five stamens.

Characteristics of Excellence in the Pelargonium.—“The flower should be large, composed of broad rose-leaf petals, free from crumple or unevenness of any kind; smooth on their edges, and forming a compact surface; round which, if a circle be drawn, the perfect symmetry of the flower would appear by the extremity of each petal touching the circle, without extending beyond it. It is indispensable that the flower should be of a stout firm texture, with sufficient liberty at the bottom of the cup to prevent its being in the least cramped; but allowing it to retain,

when fully expanded, a fine cupped form, and preventing the falling back or reflexing of the petals. Its colour, whether rich or pale, should possess great clearness: the under petals must be free from veins, and the upper petals should have a large dark *spot* running to the bottom of them, as destitute as possible of a small white feather, which is usually present, and which greatly impairs the richness of this important part. The beauty of the flower is greatly enhanced by having this spot clearly defined; and if it is surrounded by a dash of crimson, that should have a distinct termination also. The petals ought to be quite free from the least appearance of a watery edge. Finally, it is essential that the leaves should be large, delicate, and have a healthy appearance; and that the *truss* should be composed of several flowers, supported by a firm foot-stalk standing quite clear of the foliage.”—*Gard. Chron.*

Varieties.—These are so numerous, fresh varieties appearing annually, that it is useless to attempt to enumerate them; and the attempt is less needed, because each has passed its period of excellence after four or five years. The following are the best that have been introduced during the last two seasons:

Alba Perfecta (Thurtell’s), white and purple.
 Arabella (Beck’s), white and rose.
 Aurora (Beck’s).
 Bellona (Beck’s), rosy, purple and crimson.
 Chastity (Beck’s).
 Desdemona (Beck’s), maroon and pink.
 Exdemona (Thurtell’s), claret and white.
 Defiance (Thurtell’s), purplish crimson and white.
 Dr. Lindley (Foster’s).
 Duchess of Leinster (Gaine’s), orange pink, scarlet spot.
 Emperor Nicholas (Silverlock’s).
 Exactum (Foster’s).
 Favourite (Beck’s), like, but not so good as, Foster’s.
 Gulnare (M’Cormack’s), pink and white.
 Hector (Cock’s), rose and white.
 Isabella (Beck’s), pink and maroon.
 Juno (Beck’s), carmine and scarlet.
 La Polka (Staine’s).
 Lurida (Beck’s).
 Mark Antony (Beck’s), rose and purple.
 Margaret (Beck’s), maroon and pink.

Master Peel (Beck’s).
 Mustee (Beck’s), pink, purple spot.
 Orion (Foster’s), scarlet and maroon.
 Othello (Beck’s), purple and rose.
 Othello (Thurtell’s), mulberry and lilac.
 Pearl (Catleugh’s), white and crimson.
 Queen Philippa, rose.
 Rainbow (Thurtell’s), mulberry and white.
 Regulator (Thurtell’s), violet, purple and white.
 Rosy Circle (Beck’s), dark rose.
 Satellite (Thurtell’s), puce and white.
 Sir J. Broughton (Foster’s).
 Stromboli (Thurtell’s), salmon and purple.
 Sultana (Foster’s), orange and scarlet.
 Sunset (Beck’s), maroon and pink.
 Superb (Thurtell’s), purple and lilac.
 Titus (Hoyle’s), rose and carmine.
 Trafalgar (Thurtell’s), crimson and purple.
 Unique (Thurtell’s), mulberry and white.

Zanzummim (Beck’s), crimson and flesh.
 Zenobia (Beck’s), rose and mulberry.

Varieties for Forcing.—*Admiral Napier*; *Alba multiflora*; and *Washington*, for earliest; *Bella*; *Gauntlet*; *Grand Duke*; *Commodore*; *Lord Mayor*; *King Rufus*; and *Madeline*, for succession.

Raising Varieties.—Captain Thurtell, one of the most successful improvers of this flower, gives these directions:—

“First. Destroy every bad shaped (or elongated) under petalled flower in your possession.

“Secondly. Impregnate (if possible) every flower yourself, the moment it is ready to receive the farina, and thus effectually prevent the effects of the *bee*. But so long as you allow bad shaped flowers to remain in your house, you can never calculate on impregnating with any certainty; and those who attend to colour in preference to shape, will have to retrace their steps. Captain Thurtell never raised a good flower until he attended rigidly to the above rules.” See *Hybridizing*.

Sow in July. The seedlings soon appear; when with four leaves, besides the seed leaves, pot into 60’s; keep in warm green-house. In April, shift into 32’s. In June, plunge the pots in a warm border. At the close of September, return to the green-house. They will bloom in the winter or spring.

Soil.—The best compost for growing Pelargoniums is half sandy loam and

half leaf-mould. The best manure is liquid, made of sheep's dung. See *Liquid Manure*.

Propagation.—By Cuttings.—Take the cuttings in mid-July, and plant these in an open border exposed to the sun.

“In about six weeks,” says Mr. Catleugh, the florist, of Hans Place, Chelsea, “the cuttings will be sufficiently rooted to remove, and I pot them into sixty-sized pots. To prevent the worms getting into the pots, they are placed upon a temporary stage, and allowed to remain in a shady situation about three weeks, by which time the plants will be well established, and bear removing to a more exposed spot, where, under the influence of the sun and air, the wood will attain a necessary degree of hardness. Here they remain until taken into the house for the winter, which is generally done about the end of September, before danger arises from frost. To make them compact and bushy, stop them at the third or fourth joint, and shift them into forty-eight sized pots, mixing a little turfy loam and sand with the compost, to allow the water to pass freely through the soil; give but little air during eight or ten days, the plants will be then re-established, and afterwards as much air may be given as the state of the atmosphere will permit, until the beginning of December. The side lights must be kept closed during the prevalence of cold winds. The pots by this time will be well filled with roots, and the plants will require shifting into thirty-two sized pots. The bone dust which is now added must be used with caution; being of a drying nature, it is not used near the surface of the soil; the shoots are again stopped at the third joint, the house is kept at a temperature of 45° Fahrenheit for about ten days, and then allowed to fall to 40° or 42°, at which it is kept. The flues are damped two or three times every night to prevent the air from becoming too dry, and a little top air is admitted whenever the weather is sufficiently favourable. About the middle of February those plants, which are intended to be large specimen plants are shifted again into twenty-four sized pots; those of vigorous growth will require a size larger. A small stick is now put to each stem to train them into uniform and well-

shaped plants. In the beginning of April, when fires are discontinued, the plants are syringed over the top three times a week; this is done about four o'clock, at the time the house is closed, and continued during three or four weeks. The house is well damped every evening at the bottom, and the top sashes opened the first thing in the morning, to allow the damp air to escape, and during the day all the air is admitted that can be given with safety. The plants when beginning to bloom are freely watered, and protected from the scorching rays of the sun during the middle of the day by means of canvas, and are thus retained in blossom a much longer time than would be possible if this precaution were omitted. When the plants are housed the decayed leaves are removed, and whenever the green fly makes its appearance, the house is well fumigated: to do this effectually, it must be performed when the plants are in a dry state, and they must be well watered the day following. When the flowering is over, the plants are exposed for about a fortnight to the sun and air, to harden the wood before being cut down. Those plants which are intended as specimen plants the second season after heading down, are placed in a sheltered situation, when little water is given, and as soon as the new shoots are an inch long are repotted into pots from one to two sizes smaller, the old soil is shaken from the roots, and good drainage given. The plants thus treated are kept in better health during the winter, from having less soil about their roots. When repotted they are placed upon a stage in a shady situation, removed into the house at the proper time, and undergo the same treatment the second winter as described for the first. When those plants which are intended for exhibition begin to show their bloom they receive additional attention, a little liquid manure is occasionally given, they are no longer syringed over the top, bees are kept out of the house by means of gauze blinds, every precaution is taken to preserve their beauty, and they are never allowed to flag from exposure to the sun or want of water. Every grower should begin early to train his plants for exhibition; when the shoots are young and tractable any direction may

be given to the stems; a uniform and handsome appearance will arise from the practice, and the plants will require fewer supports and less pulling about at the time they receive their final dressing. The flowers should be so arranged as to present an equal distribution of bloom over the leaf of the plant, to effect which the stems must be secured to small willow twigs.”—*Gard. Chron.*

Grafting.—Mr. J. Alexander, of Heath Farm, Atley, has grafted the Pelargonium very successfully, and his method is as follows:—

“Graft in August or September, using pretty well ripened wood of the same year’s growth; cut back the stock to about three inches long, and in ten days afterwards graft in the manner of whip-grafting, and tie with bast and clay, over which put a little moss to keep the clay from cracking, and to preserve the whole in a moist state, being occasionally sprinkled with water in a shadowy part of a vinery, and in a month the grafts begin to grow; put into a cold frame for a few days, then take out of the pot, and all the earth being shaken from the roots, repot in fresh soil, and treat as the other Pelargoniums. Weak growing sorts grow stronger when grafted on robust kinds than on their own roots.”—*Gard. Chron.*

Where the saving of space in the green-house is desirable, two or more Pelargoniums may be grafted upon the same stock. As many as ten have been thus united. Pelargonium elegans and Beauty of Ware have been employed successfully as stocks. Cleft-grafting succeeds as well as whip-grafting. Worsted may be employed instead of bast; and inarching is even a better mode of propagating than grafting.

Growing in Open Ground.—Mr. J. Murdoch has given us the following directions on this head:—

“Put the cuttings into small pots at once, which obviates any check they would receive when removing them, either from cutting-pots or the open ground; make beds of mixed varieties, chiefly the Old Graveolens, Fair Helen, Lady Essex, Emily, and Moore’s Victory, which flower freely all the summer, and though not so gaudy as some, have a more delightful fragrance.—

About the end of July, having removed all Pelargoniums to the back of a north wall, commence cutting them down, arranging the prunings as cut off alphabetically for the convenience of finding the sorts. When cut remove them into a shed; on the following morning commence planting the cuttings. The scarlet ones put into sixty or small forty-eight pots, and place on a flue, within a green-house, where they require very little water until they are struck, when remove them to a cold frame; give them plenty of air, and keep them there till the beginning of November, when stow them away in a vinery intended to be forced about the beginning of February. At that time, or earlier, repot them and place them in another vinery to be forced. By turning-out in time they are nice plants. The cuttings of other sorts put in smaller pots, and plunge in saw-dust on a gentle hot-bed made of leaves covered by a frame; give a little water to settle the mould about the cuttings. They require very little after, as the greatest enemy is damp; frequently give a little air. They require scarcely any shading, unless the sun is very hot. After they are struck they receive the same treatment as the scarlet ones.”—*Gard. Chron.*

Growing for Exhibition.—Mr. Cock, the florist, of Chiswick, one of the most successful cultivators of this flower, has published the following directions:—

“Strike the cuttings the beginning of June, or sooner if the plants are sufficiently strong to allow taking two or three shoots off without injury. As soon as they are rooted, pot them in sixty-sized pots, and remove them to a shady situation, or place them in a cool frame, shading them constantly when the sun is out, until they have taken fresh roots. Next transfer to an open situation, and place on slates or boards. As soon as the plants will bear the sun without flagging, stop them. In September repot them into forty-eight sized pots, and at that period commence training them into the forms you intend them to have. In December or January, those which are sufficiently strong are shifted into sixteen-sized pots, allowing plenty of potsherds for drainage; the others do not shift till March. In these pots they remain to flower. About the middle of July, or the begin-

ning of August, cut them down and place them in a shady situation, to keep the sun from drying the soil too fast; water is now applied very sparingly. As soon as the plants have thrown out shoots an inch long, the soil to be nearly all shaken off, and repotted into the same sized pots.

“When they have taken fresh root, the superfluous shoots are thinned out; in this state they remain until they are removed into the green-house.

“2d. *Treatment in the Green-house.*—The plants for exhibition are placed on the stage at least four feet apart; air liberally supplied where the situation will allow it; the front sashes should be left open all night, while the weather will permit. In November the plants are stopped, a stick put to each shoot to make the plants uniform, and the leaves thinned out to allow the air to pass freely through the plants.

“In December or January the strongest plants are again selected, and repotted into No. 8 sized pots; additional heat should then be applied to enable the plants to root quickly. In February commence syringing them; this is done early in the afternoon, so that the leaves may dry before night.

“In March again repot into No. 2 sized pots, allowing a larger quantity than before of potsherds for drainage; water is now very liberally supplied.

“When the flowers begin to expand, they are shaded on the outside of the house with cheese-cloth, which is better than canvas, as it admits more light, and the temperature will not be higher. Air should always be admitted before the sun has much power on the glass; this precaution in a great measure prevents the appearance of the green-fly.

“3d. *In applying fire heat* the greatest care is required, for on this success will in a great measure depend. Light the fires at three or four o'clock in the afternoon, as circumstances may dictate; the fires to go out at eight or nine o'clock, by which time the temperature ought to be 40° or 42° Fahrenheit, which is amply sufficient; relight them at three or four o'clock in the morning, by which means the plants are never overheated, as is frequently the case when the fires are continued until a later period in the evening.

“4th. *Preparing the Soil.*—Chop up

loam with the turf and place in a deep pit; shake up lightly into a heap in the form of a mushroom bed. If the weather is hot and dry at the time, well water with strong manure water, and cover over with slates as closely as possible to keep the ammonia, &c., from disengaging. In this state let it remain for fifteen or sixteen days, then put to every barrowful of loam one of dung, covering the heap slightly over at last with loam; let this heap remain for a month or five weeks, then to be turned over three or four times, that the loam and dung may be well mixed together; in twelve months it will be fit for use. To two barrowfuls of this compost add one of leaf-mould and a peck and a half of silver-sand.”—*Gard. Chron.*

Manures.—As already stated liquid manure made from sheep's dung is the best application, but a little rubbly charcoal, about the size of nuts, and a small quantity of bone-dust, promote the luxuriance and beauty of these flowers.

Disease. See *Spot*.

PELLITORY OF SPAIN. *Anthemis Pyrethrum*.

PELTARIA *alliacea*, herbaceous, and *P. glastifolia*, annual, are hardy plants. Seed. Light loam.

PEN ÆA. Eight species. Green-house evergreen shrubs. Ripe cuttings. Sandy peat.

PEN NY ROYAL. See MENTHA *pulegium*.

PENTAPELES. Two species. Stove herbaceous. Cuttings. Light rich loam.

PENTARAPHIA *longiflora*. Stove evergreen shrub. Cuttings. Rich light loam.

PENTAS *carnea*. Stove shrub. Cuttings. Light rich loam.

PENTLANDIA *miniata*. Hardy herbaceous twiner. Probably by division. Rich light loam.

PENTSTEMON. Of this hardy herbaceous flower there are forty-one species, but the following is a good selection:—

- P. argutus, purple.
- P. atropurpureus, brownish purple.
- P. campanulatus, rosy red.
- P. crassifolius, deep lilac.
- P. diffusus, deep blue.
- P. gentianoides, brownish purple.
- P. gent. coccineus, scarlet.
- P. glandulosus, deep blue.

P. latifolius, white, slightly stained with purple.

P. Mackayanus, purple and white.

P. Murrayanus, bright scarlet.

P. qvatus, bright blue.

P. procerus, bright blue.

P. pulchellus, light blue.

P. Scoüleri, lilac.

P. speciosus, bright blue.

P. venustus, light purple.

Soil.—A light rich loam, mixed with peat. They may be increased by division, but the strongest plants are raised from seed.

Propagation.—Sow in October, or until January, in a cool frame. Keep the plants near the glass until strong enough for planting out in late spring. Always save seed when you can, and keep a stock of young plants to supply vacancies.

PENTZIA flabelliformis. Green-house evergreen shrub. Ripe cuttings. Loam and peat.

PEPPERMINT. *Mentha piperita*.

PEPPER VINE. *Ampelopsis bipinnata*.

PERENNIAL. A plant that lives for more than two years.

PERESKIA. Five species. Stove cactaceous plants. Cuttings. Sandy loam.

PERGULARIA. Three species. Stove evergreen twiners. Cuttings. Rich loam.

PERICALLIS tussilaginis. Green-house herbaceous. Seed and cuttings. Loam and peat.

PERILOMIA ocymoides. Green-house evergreen shrub. Young cuttings. Sandy peat.

PERIPLOCA. Four species. Hardy twiners, except the stove climber, *P. mauritiana*. Layers and cuttings. Common soil.

PERIPTERA punicea. Stove evergreen shrub. Seed and cuttings. Loam and peat.

PERISTERIA. Dove Flower. Six species. Stove orchids. Division of the bulbs. Turfy loam and sandy peat, with a little leaf-mould. *P. Barkeri* is one of the most beautiful of this genus, and for its cultivation Mr. Insleay, of Springfield, near Birmingham, gives the following directions:—

“On either a square twig or a conical wire basket, with the bottom and sides covered with moss, put pieces of potsherds, afterwards that of the pseudo-

bulbs, and lastly fill up the basket with peat in pieces about the size of walnuts; place the plant near the glass.

“When the plant begins to grow, supply it moderately with water; but as its growth increases a larger quantity must be given, and when in full flower, water freely. Some of this elegant tribe of plants are injured if syringed over head; such, however, is not the case with this plant.

“The plant having flowered, and the pseudo-bulbs being matured, (but in a dormant state,) they should not be removed from the same temperature they were in, when in flowering condition, which ranged from 70° to 80°, but especial care should be taken to keep them dry until the period of rest is over.”—*Gard. Chron.*

PERITOMA serrulata. Hardy annual. Seed. Sheltered border.

PERIWINKLE. *Vinca*.

PERNETTIA. *Arbutus*.

PERSEA gratissima. Stove evergreen shrub. Layers and ripe cuttings. Turfy loam and peat.

PERSIAN SUN'S-EYE. *Tulipa oculis solis*.

PERSICA. Two species and many varieties. Hardy deciduous trees. *P. vulgaris* the PEACH, and *P. lavis* the NECTARINE, which see.

PESOMERIA tetragona. Stove epiphyte. Division of bulbs. Wood covered with moss.

PERSOONIA. Eighteen species. Green-house evergreen shrubs. Ripe cuttings. Sandy loam and peat.

PETALIDIUM barlerioides. Stove shrub. Cuttings. Rich light loam.

PETIVERIA. Two species. Stove evergreen shrubs. Cuttings. Loam and peat.

PETREA. Four species. Stove evergreens. *P. stapelia* as a climber, and *P. volubilis* as a twiner, are among our handsomest plants. Cuttings. Rich loam.

PETROBIUM arboreum. Stove evergreen shrub. Cuttings. Sandy loam.

PETROCALLIS pyrenaica. Green-house herbaceous. Seed or division. Sandy loam and peat.

PETROMARULA pinnata. Half-hardy herbaceous. Division. Sheltered light rich loam, and winter protection.

PETROPHILA. Tenspecies. Green-house evergreen shrubs. Ripe cuttings. Turfy sandy loam.

PETROSELINUM. Two species. Hardy biennials. Seed. Common soil. See *Parsley*.

PETTY-WHIN. *Genista anglica*.

PETUNIA. Five species. Tender or half-hardy herbaceous. Seed and cuttings. Sandy loam and leaf-mould. From *P. nyctaginiflora*, which is white, and *P. violacea*, purple, are raised the numerous varieties adorning our gardens.

Select Varieties:

Alice Gray.	Magna rosea.
Arethusa.	Magnet.
Beauty.	Massengii.
——— superb.	Medora.
Bicolor.	Ne plus ultra
Bumons de Willi	(Pearson's).
(Van Houte's).	Nixenii (Harri-
Caryophylloides.	son's).
Constance.	Ornatissima.
Delicata.	Othello.
Dwarf-pencilled.	Ovid.
Enchantress.	Pet (Ivery's).
Exatum.	Picta.
Gem.	Prince Albert.
Gigantea.	Psyche.
Grandis.	Punctata (Mil-
Highclare.	ler's).
Hildida.	Reliance.
Hope (Smith's).	Rook's Nest.
Illuminata.	Rosea alba.
Kentish Beauty.	Splutherii.
——— Bride.	Striata superb.
Lady Sale.	Unique.
Magician.	——— superb.
Magna Charta.	Variiegata.

Characteristics of Excellence.—Flowers flat, circular, free from indentations, and firm of texture. Colour, bright and well-determined. Flowers numerous.

Propagation by Seed.—Sow in March in a gentle hot-bed, and plant out at the end of May, like the half-hardy annuals; or sow on an open compartment, when the spring is farther advanced.

By Cuttings.—May be struck almost at any time, but a good time is "early in September. The cuttings should be put into sixties, and placed in the front of a hot-bed until they have struck root, which will be in about three or four weeks, at which time they may be removed to a cold pit, or to the front of a green-house.

"Early in February they should be shifted into forty-eights, in a mixture of sandy peat, leaf-mould, and loam, and repotted as fast as the pots become full

of roots, using an inch and a half of rubbly charcoal, to act as drainage, at the bottom of each pot. During the time they are growing in pots they should be watered two or three times a week with liquid manure; and the latter end of May they may be turned out into the flower garden."—*Gard. Chron.*

Winter Protection is best afforded them in a cold pit, frame, or greenhouse. By a little attention, and judicious watering, &c., they will begin to bloom early in the spring.

PEYROUSIA. Eight species. Greenhouse and half-hardy bulbs. Offsets. Sandy loam and leaf-mould. Like *Ixia*, they will usually thrive in a light-soiled, sheltered, south border.

PHACA. Fourteen species. Hardy herbaceous, except *P. canescens*, requiring a green-house. *P. glabra* is a hardy deciduous trailer. Seed. Common soil.

PHACELIA. Six species. Hardy herbaceous or annuals. Division or seed. Common soil.

PHACOSPERMA peruviana. Stove herbaceous. Seed. Peat and loam.

PHAIUS. Five species. Stove epiphytes and orchids. Of the former *P. albus* is most desirable. It is propagated from young shoots. Peat and potsherds. The other species are increased by division of the roots. Peat and sandy loam.

PHALÆNA vanaria. A moth, abounding usually in June and July, is thus described by Mr. Curtis:—

"The horns of the male are pectinated; the wings are of an ash colour and freckled; the upper have four brown marks on the superior margin, the second crossing the centre of the wing.

"The larva is a looper, having only ten legs. It infects the red currant and gooseberry bushes, feeding upon the leaves, and is found in May. It is about an inch long, bluish green, with two white dorsal and two yellow lateral lines. It is dotted with little black tubercles, which produce short black hairs. It changes late in May to a chestnut-coloured chrysalis, in a slight web, on the surface of the earth."—*Gard. Chron.*

PHALÆONOPSIS amabilis. Stove epiphyte. Side shoots. Wood and moss.

PHALANGIUM. Five species. All

herbaceous; *P. longifolium*, greenhouse; *P. glaucum*, and *P. repalense*, half-hardy; the others hardy. Division and seed. Sandy loam and peat.

PHALEROCARPUS *serphyllifolia*. Hardy evergreen creeper. Cuttings. Moist bog.

PHALOCALLIS *plumbea*. Half-hardy bulb. Seed. Probably in a light soil, under a south wall.

PHARBITIS. Twelve species. Twiners, chiefly annual. *P. caerulea* is a hardy evergreen; and *P. varia*, a stove evergreen twiner. The others are hardy and greenhouse, except *P. lispida*, requiring a stove. Seed. Sandy loam and leaf-mould.

PHASEOLUS. Thirty species. Annual twiners, chiefly hardy; a few are deciduous perennials. Seed. Light rich loam. See *Kidney Bean*.

PHEASANT'S-EYE. *Adonis autumnalis*.

PHEALIMUM. Six species. Greenhouse evergreen shrubs. Cuttings. Peat, sand, and loam.

PHILADELPHUS. Fourteen species. Hardy deciduous shrubs. Layers and suckers. Common soil.

PHILIBERTIA *grandiflora*. Greenhouse evergreen twiner. Cuttings. Sandy loam and peat.

PHILLYREA. Ten species. Half-hardy evergreen shrubs. Cuttings and layers. Common soil.

PHILOTHECA *australis*. Greenhouse evergreen shrub. Young cuttings. Sandy peat and sandy loam.

PHILYDRUM *lanuginosum*. Greenhouse biennial. Seed. Loam and peat.

PHLOGOCANTHUS *curviflorus*. Stove evergreen shrub. Cuttings. Light rich loam.

PHLOGOPHORA *meticulosa*. Angle shades moth. This is a night moth, appearing from May to October. The caterpillar is green, spotted with white. Upper wings of the moth, rosy white. The caterpillar feeds upon the Brassica tribe.

PHLOMIS. Twenty-four species. Hardy and half-hardy evergreens and herbaceous perennials. Cuttings. Light rich loam.

PHLOX. Forty-eight species. Hardy herbaceous. Division and cuttings. Rich loam. *P. Drummondii* is one of the prettiest of the genus, and its culture is thus detailed by Dr. Lindley:—

“The seeds should be sown about

the end of March, in pots filled with a light sandy soil, and placed on a moderate hot-bed, or in a cucumber or a melon frame. In this situation they will soon germinate; and before the first rough leaf appears they should be potted off, three or four together in a large sixty pot, placing the plants at equal distances round the side. When potted, they should be returned to the frame, and kept close for a few days, to recover from the effects of their removal; after which they should be gradually hardened off, by giving them plenty of air during the day in fine weather. Finally, about the beginning of May, they should be removed to a cold pit or frame, where they can be fully exposed during the day, covering them with the lights only at night, and in bad or cold weather. About the end of May, when all danger of late spring frost is over, they may be planted in the open border. The soil into which they are transferred should be either a light rich sandy soil or peat, with which a little well-rotted dung has been mixed. The plants will require to have a little water once or twice after they are planted, especially if the weather is dry at the time; but it is advisable not to water them after they are once well established. The chief causes of failure are, sowing the seeds too soon, or allowing the plants to get very dry, or pot-bound, before they are planted out. If once they become stunted, they will never make good plants; and the same may be said of those which have been kept in too warm a place.”—*Gard. Chron.* It may be had in perfection from seed sown on a rich border, latter end of spring, and cultivated without transplanting.

PHŒNIX. Date Palm. Eight species. Stove palms. Seed. Rich clayey loam.

PHŒNOCOMA *prolifera*. Stove evergreen shrub. Cuttings. Peat and sandy loam.

PHOLIDOTA. Four species. Stove epiphytes. Division of bulbs. Wood and moss.

PHOTINIA. Four species. Half-hardy evergreen trees. Ripe cuttings. Loam and peat, and on a south wall.

PHYCELLA. Eight species. Greenhouse bulbs; but they will grow in a warm border if protected. Seed and offsets. Loam, sand, and peat.

PHYLICA. Thirty species. Green-house evergreen shrubs.

PHYLLIS nobla. Green-house evergreen shrub. Cuttings. Rich clayey loam.

PHYLLOCLADUS rhomboidalis. Green-house evergreen tree. Ripe cuttings. Loam and peat.

PHYLLOMA. Four species, all evergreens. *P. aloiflorum* is a stove tree; the others, green-house shrubs. Suckers. Sandy loam.

PHYLLOPERTHA horticola. The garden beetle. It is thus described by Mr. Curtis:—"It is about four lines and a half long, and three broad. Its elytra, or wing cases, are reddish-brown, shining, and do not reach quite to the extremity of the body; the head and thorax are dark green. It appears on the leaves of the apple and pear in June, feeding on the very young fruit. When alarmed it feigns death, by falling on its back, and extending its legs in a stiffened manner, and in different directions. The female deposits her eggs in the earth, and the larvæ feed on the roots of plants.

The only method we are acquainted with of lessening the numbers of these beetles, is to collect and destroy them early in the morning, or late in the evening, when they may be found sticking to the plants, and they can readily be seen from their colour and size. During the day, and particularly if the weather is hot, they fly about with great swiftness, and are not easily caught."—*Gard. Chron.*

PHYSEMATIUM. Two species. Stove herbaceous. Division. Peat and loam.

PHYSIANTHUS albens. Stove evergreen climber. Seed and cuttings. Loam and peat.

PHYSOCLAINA. Two species. Hardy herbaceous. Seed and division. Common soil.

PHYSOPIPHION. Four species. Stove epiphytes. Division of bulbs. Wood and moss.

PHYSOSTEGIA. Seven species. Hardy herbaceous. Division. Rich light loam.

PHYSURUS pictus. Stove shrub. Cuttings. Light rich loam.

PHYTELEPHAS macrocarpa. Stove evergreen shrub. Seed. Peat and loam.

PHYTEUMA. Twenty-three spe-

cies. Hardy herbaceous. Seed and division. Common soil.

PHYTOLACCA. Nine species. Chiefly stove herbaceous. *P. decandra* is hardy and wide spreading. Seed and cuttings. Rich light soil.

PIARANTHUS. Seven species. Stove evergreen shrubs. Cuttings in the spring. Sandy loam and lime rubbish.

PICK-AXE, should have a handle three feet and a half long, made of ash; and the points or edges of the head should be of well-steeled iron. There are three varieties:—1. The pick with two points, for loosening hard surfaces. 2. The pick-axe, for cutting through roots of trees when felling. 3. The mattock, with one pointed and one flat edge, for loosening surfaces, and grubbing up roots.

PICOTEE. See *Carnation*.

PICRIDIMUM. Four species. Hardy herbaceous and annuals. Division or seed. Common soil.

PICTETIA. Two species. Stove evergreen shrubs. Young cuttings. Loam and peat.

PIERARDIA dulcis. Stove evergreen tree. Cuttings. Sandy loam and peat.

PIERIS Cratægi. Hawthorn, or Black-veined Butterfly. Is white, with black ribs or veins on the wings. It is very much like *Pontia Brassicæ*. The caterpillar is dirty yellow, hairy, black-headed, and a brown stripe down its sides. The caterpillars moult several times, and they are usually found on the apple-tree, where both the yellow eggs and caterpillars may be found in June. The caterpillars draw two or three leaves together with a web. These should be sedulously sought for and destroyed.

PILEA muscosa. Stove evergreen trailer. Cuttings. Common soil.

PIMELEA. Twenty-eight species. Green-house evergreen shrubs. Young cuttings. Sandy peat and loam.

PIMPERNEL. *Anagallis*.

PINCKNEYA pubens; a beautiful or rather curious southern shrub, scarcely sufficiently hardy to support the winters of Pennsylvania. Cuttings. Sandy peat, beneath a south wall.

PINE-APPLE. *Ananassa.* The pine-apple is but little cultivated in the United States, though it is probable the

increase of wealth and luxury among us, may ere long induce its culture under glass, in common with the grape, peach, &c., though the same necessity as in England does not exist—our proximity to the tropics enabling us, at least on the seaboard, to obtain the pine in tolerable perfection, and at a tithe of the cost of producing it ourselves; we, however, insert the article on this fruit as it stood in the original edition of this work.

I believe the most successful cultivator of this fruit is Mr. Barnes, gardener to Lady Rolle, at Bicton, near Sidmouth, and to that excellent horticulturist I am indebted for the following detail of his latest system of culture:—

Varieties:—We cultivate the Queen principally for fruiting at all seasons. We also grow a few of the large black kinds, which are all of easy culture, and may be grown to a very large size indeed. We have of late grown the Queen Pine from six to nearly eight pounds in weight, and those have been produced from plants of only a few months' growth. The other varieties we cultivate are—the Russian Globe, English Globe, Enville, Green Olive or St. Vincent, Montserrat, Black Jamaica, Otaheite, Brown-leaved Sugar Loaf, and Black Antigua, only two or three plants of each, and those we are about reducing. All these varieties are of easy culture, and free swellers, capable of being grown to a great weight. To equal a Queen of six pounds weight they ought to be from ten to fourteen pounds weight each fruit, but we only average them from six to ten pounds weight.

Propagation.—I have practised in my time various methods, but my present mode is only by suckers. These are pulled off immediately the fruit is cut, and at once potted, no matter what season of the year it may be. Thus, as soon as a fruit is ripened, the plant is lifted out, and another at once planted in its place. One sucker, or, perhaps, two, are occasionally left, but not often. Those taken off are at once potted. By this practice a constant succession of plants is kept up, and fruit of various ages. I never care for the *crowns*, though, if taken off in due time, and potted at once, in well sweetened dry pulverized earth, they will make equally good plants. Of course the suckers

should be placed in the same kind of earth, not damp, or they will be liable to be affected at the base with rot or mildew.

Soil.—The pine will grow well in any kind of turfy, rooty, well-sweetened pulverized soil, from heath soil to a heavy clayey loam. I make choice of a heathy turf when obtainable, with the roots and its natural vegetation all with it; never breaking it until at the potting bench, as the process of potting is going on. Then we break the sods, which are mostly chosen about two or three inches in thickness, in such kind of pieces as we can thrust into the pots, putting in, as we proceed, some pieces of charcoal, always taking care to drain the pots carefully, which is one of the chief essentials. Our drainage is principally coarse charcoal, averaging one-fourth of broken rubbly potsherds, which are placed first round about the bottom; then, if it is a seven-inch pot, for a sucker, the drainage averages two inches at least; and if fifteen or eighteen-inch pots, which are the largest fruiting pots I make use of, the drainage is employed in a coarser state, and about two inches more of it, and the soil too is thrust into the pots rougher—brambles, furze, bushes, heath, and grass altogether—with no other kind of manure, besides an occasional lump or handful of rubbly charcoal, merely to fill up some of the crevices. *It is not rammed*, that is to say, not *pounded*, or jammed together in the same way potting is too often done, but pushed down as we proceed, quietly. Thus the soil is really a whole body of drainage—there is no obstruction either to the atmosphere or the water. I have no particular time or season for shifting, potting, or repotting—we do all these at any season of the year, whenever we fancy the plants seem to require it. Never shift a plant, or repot, but twice at the most. If it is a strong spring sucker, it gets with me but one potting from the sucker pot to the fruiting pot. I have left off altogether making use of any kind of manure with the earth besides charcoal; excepting to free-growing plants occasionally we apply weak liquid manure—as clear as wine—always applying it in a tepid state, and in the growing, warm part of the season. To the succession plants we apply it with the syringe or engine over the

whole of the foliage and surface of the plunging materials.

"*The Bottom Heat* is at all times kept very moderate, the surface loosened often with a pointed stick, or two-pronged fork, so that there is no obstruction to prevent the free circulation of the atmosphere. As to stating the exact temperature in our variable dark climate, it is impossible—but the right side is to aim at a too low, instead of overdoing it; the former is the easiest to be got over. A small portion of fermenting or plunging materials, kept in a kindly condition, is always quite sufficient to command bottom heat enough. My fruiting plants have about one foot eight or nine inches of plunging materials, and stand on loose bricks in it; of course, as the season and temperature of the interior atmosphere alter, so does the bottom heat, under this system; I look to nature for the example. I cannot inform you how strong, or to what extent, the manure water ought to be applied to plants of such or such an age, or size, or variety—so much depends on a variety of circumstances; all I know is, what to apply to those I have under my own charge. A pot or two of good ale, or a slice of beef or bacon will do wonders with a hard-working, strong, healthy-constituted man—which would not be likely in the least to agree with another person, afflicted with disease or weakness.

"*The Temperature of the Air*.—I at all seasons regulate according to the light we receive, never tying it down to a certain degree. Some light, still, mild days, even in late autumn or winter, five degrees more can be well afforded, with air, than in a dark, cold, gloomy, windy, or stormy day, could safely be applied in summer. Suffice it to say, I regulate the atmospheric interior air from about 55° to 75°, the former the minimum in short dark days, and the latter the maximum in long light days; for heat without light is sure to cause, in time, immaturity, disease, and vermin.

"*Diseases and Vermin*.—By following the above directions, no such thing will be seen or known, and those that are already troubled with either, will, by following the above directions, get very soon clear of either."

To this mode of Pine-growing made

easy, but little need be added. Those who are not so successful in keeping their pine-apples free from *Scale*, and other diseases, will find some information on those points under their respective titles in other pages of this volume. I will only venture to add, that I think growing the pine-apple in beds is preferable to growing it in pots; all Mr. Barnes's directions being adapted to that. I also think Mr. Barnes's maximum temperature rather too low, and that during bright sunny weather, and the long days of summer, 80° may be used with advantage. In Bengal, pine-apples grow in the open air with very little cultivation, and attain a weight of seven pounds, in a temperature ranging between the extremes 120° and 53°.

PINE-TREE. *Pinus*.

PINEASTER BEETLE. See *Bostrychis*.

PINGUICULA. Six species. Hardy and half-hardy herbaceous. Division. Shaded, boggy soil.

PINK. *Dianthus*.

Varieties.—These are added to annually; but the following are first-rate flowers, sufficient for any amateur:—

Acme (Brown's).

Alpha (Garrat's).

Achates (Neville's).

Alfred (Wallace's).

Beauty (Fairbairn's).

Beauty (Turner's).

Conqueror (Barrett's).

Defiance (Norman's).

Dr. Edwards (Ottey's).

Duke of Northumberland (Headley's).

Duke of Wellington (Norman's).

Eclipse (Brown's).

Eclipse (Bankell's).

Enchantress (Neville's).

Garland (Brown's).

Gauntlet (Dawson's).

Gem (Hodge's).

Great Britain (Ward's).

Henry (Norman's).

Henry (Wallace's).

Lord Brougham (Acres).

Mary Anne (Jelf's).

Masterpiece (Turner's).

Miss Kate (Fairbairn's).

Monitor (Neville's).

Ne plus Ultra (Kean's).

Omega (Unworth's).

One Hundred and Thirty-four (Brown's).

One Hundred and Sixty-six (Hodge's).

President (Creed's).
 Prince Albert (Legg's).
 Prince of Wales (Wilmer's).
 Queen of England (Hale's).
 Roseana (Church's).
 Triumphant (Ibbet's).
 Warden (White's).

Characteristics of Excellence.—Flower circular when viewed in front; semi-globular in profile, and uniform in size on the same plant. Petals stout, smooth-edged, each row smaller than those below it. Colour, ground white; lacing, whatever its tint, should have a border of white beyond it; colour of the lower limb of the petal extending so as to be seen above the white edge of the petals above. Lacing unbroken.

Raising Varieties.—M. Fries Movel, gives these directions:—

“Just before sunrise open carefully the flower to be operated on, and abstract the anthers with small pincers. About eight or nine o'clock place the ripe pollen from another flower upon its stigma, and repeat this two or three times in the course of the same day. If the act of impregnation has taken place, the flower will fade in twenty-four or thirty-six hours; but if not, the flower will remain in full beauty, in which case, the attempt must be repeated. This should always be done in fine serene weather, and care should be taken to defend this impregnated flower from rain and mists. Plants raised from seeds which have been crossed always bear the form of the mother, but take the colours of the male parent. Fewer seeds are produced by art than by nature alone; and the impregnated flowers are less visited by bees than others.”
 —*Gard. Mag.*

Layering.—Mr. J. Mearns, of the Manchester Zoological Gardens, says that he thus conducts this operation:—

“I do not use a dibber to plant with, but my forefinger; I lay the lower end of my slip horizontally upon the surface of the soil, and so press it down into it; when from the firmness of the soil, the slip is compelled to clip round the end of the finger. With the other hand I turn up the top to its perpendicular, and press the lower end down till the tail is about half an inch beneath the soil; I then make the soil firm, and the operation is complete. The pipings are best left with no other attention after planting, besides occasional water-

ing in dry weather, and keeping them free from weeds till the time for planting out, which may be done at any time after the plants are perfectly rooted; the usual season, however, to plant out for the flowering in the highest perfection is September, and for propagation all the month of June, even to the middle of July.”—*Gard. Chron.*

By Pippings.—In selecting the grass (stems) for pippings, strong and short jointed shoots should be chosen. The piping should be cut off with a sharp knife immediately below the second or third joint from the top of the shoot, and it may then be readily disengaged from the two leaves which surround its base, and which are commonly termed a sheath. The tips of the leaves should be shortened for the sake of convenience, otherwise when planted it will be difficult to prevent the hand glass from resting upon them, or from disturbing them whenever it is removed. As the pippings are prepared, they should be put into a basin or pan filled with water to prevent them from flagging before they are planted. For this and similar delicate operations the cool hours of the evening are most suitable. In planting the pippings they should be pressed firmly into the soil to the depth of about half an inch, leaving them an inch and a half apart every way; and after being properly secured, they should be gently watered through a fine rose to settle the mould closely round the stems, and as soon as the leaves become thoroughly dry, a bell glass should be placed over them. The glass should be pressed lightly into the mould, to prevent as much as possible the ingress of air. In sunny days, the bed should be shaded from seven to eight o'clock in the morning until five or six in the evening; and if there is any appearance of damp amongst the pippings, the glasses should be occasionally taken off to allow them to dry, and all plants so attacked should be immediately removed. It is very probable that the pippings will not require to be watered until the greater part of them have taken root; should watering, however, be necessary, the leaves must be allowed to become dry before the glasses are replaced. As soon as roots are formed the hand glasses should be slightly raised on one side, and may be gradually withdrawn. The young plants,

after being by degrees inured to the sun, may be transplanted six inches apart in an open bed previously prepared for the purpose, in which situation they may remain until required for planting finally in the beds, where they are to bloom.—*Gard. Chron.*

Soil and Manure.—Sandy turfy loam, such as the top spit of an old pasture, mixed with one-fourth its bulk of old cow-dung, makes a soil very beneficial to this flower. Woollen rags mixed with the soil are also strongly recommended.

Bed.—Raise the bed six inches above the soil around, and formed like a pitched roof, thus: The compost should

Fig. 128.



be at least a foot deep. Plant in rows, and twelve inches apart each way.

After Culture.—"The first thing to be attended to will be to thin out the flower-stems, in order to throw more strength into those which are left. When the plants are weak all the stems should be removed but one, and on a plant of moderate size not more than three should be retained. These again should be looked over, and the lateral flower-buds removed from them, leaving only the terminal bud and the next but one below it; provided these are perfect in form, all the rest may be pinched off. In tying up the stems of pinks and other plants of this class great judgment is required; in fact, delay is better in this instance than too much haste. If tied too high at first, the stems, as they lengthen, are prevented by the ligature from growing erect, and become crooked, or perhaps snap off at the joints. They should, therefore, be looked to every day where practicable; and if there is the least appearance of any flower-stem having become cramped the tie should immediately be cut loose. The safest way is to secure the bush to the flower stick, to which the stem should be loosely tied so as to allow it perfect liberty to slide through as it increases in height. These ligatures, when the plants have acquired their full growth, can be easily removed, and the plants

tied close without further hazard. When the forwardest blooms begin to expand, hoops should be fixed across the bed, to support mats or any other lighter material that will serve to protect the flowers either from the rain or from the rays of the sun. They need not, however, be shaded earlier than nine o'clock in the morning, or later than five or six in the evening; but if there is the least appearance of a wet night, they had better be covered before leaving them. Should the season be dry, they will require regular watering between the rows; rain or pond water, where procurable, is always to be preferred. A little clay or stiff loam placed in the form of a margin round the edge of the bed would serve as a basin, and prevent the water from escaping into the path or alley."—*Gard. Chron.*

PIN-PILLAR. *Opuntia curassavica*.

PINUS. Fir Tree. Sixty-eight species and many varieties. Seed, layers, inarching or grafting. Sandy loam on a dry subsoil. See *Coniferæ*.

PIP, in floriculture, is a single corolla or flower, where several grow upon a common stem, as in the Polyanthus and Auricula. The pips thus growing together are described as a *Truss*.

PIPER. Pepper. Twenty-seven species. Stove evergreen shrubs. Cuttings and suckers; loam and peat. On the culture of the Black Pepper, (*P. nigrum*,) Dr. Lindley observes, that "it grows luxuriantly in many stoves, but is shy in ripening its fruit. This is probably owing to the uniform moisture which is kept in these places. It should be planted in a large tub or box well drained, all the strong flower-bearing shoots should be supported with strong stakes, and the small useless ones cut away. When not growing much, keep it rather dry, and give it a slight check, and be careful not to give it too much water after flowering. Bottom heat, particularly when growing, is indispensable."—*Gard. Chron.*

PIPERIDGE, the *Barberry*.

PIPES for heating horticultural structures are preferably made of cast iron, painted black. Earthenware has been recommended for the purpose, but they are so much more liable to breakage and leakage, as to outweigh any original saving in the cost. For draining, earthen pipes with a bore an inch in diameter are the best.

TABLE of the quantity of pipe, four inches diameter, which will heat one thousand cubic feet of air per minute, any required number of degrees; the temperature of the pipe being 200° Fahrenheit.

Temperature of external air.	Temperature at which the room is required to be kept.									
Fahr. Scale.	45°	50°	55°	60°	65°	70°	75°	80°	85°	90°
10°	126	150	174	200	229	259	292	328	367	409
12	119	142	166	192	220	251	283	318	357	399
14	112	135	159	184	212	242	274	309	347	388
16	105	127	151	176	204	233	265	300	337	378
18	98	120	143	168	195	225	256	290	328	368
20	91	112	135	160	187	216	247	281	318	358
22	83	105	128	152	179	207	238	271	308	347
24	76	97	120	144	170	199	229	262	298	337
26	69	90	112	136	162	190	220	253	288	327
28	61	82	104	128	154	181	211	243	279	317
30	54	75	97	120	145	173	202	234	269	307
Freezing point 32	47	67	89	112	137	164	193	225	259	296
34	40	60	81	104	129	155	184	215	249	286
36	32	52	73	96	120	147	175	206	239	276
38	25	45	66	88	112	138	166	196	230	266
40	18	37	58	80	104	129	157	187	220	255
42	10	30	50	72	95	121	148	178	210	245
44	3	22	42	64	87	112	139	168	200	235
46		15	34	56	79	103	130	159	190	225
48		7	27	48	70	95	121	150	181	214
50			19	40	62	86	112	140	171	204
52			11	32	54	77	103	131	161	194

To ascertain by the above Table the quantity of pipe which will heat one thousand cubic feet of air per minute:—find, in the first column, the temperature corresponding to that of the external air, and in one of the other columns find the temperature of the room; then in this latter column, and on the line which corresponds with the external temperature, the required number of feet of pipe will be found. See *Hot water and Steam*.

PIPE-WORT. *Eriocaulon*.

PIPING. See *Pink and Carnation* for this mode of propagation.

PIPTANTHUS *nepalensis*. Hardy deciduous shrub. Layers and cuttings. Rich loam.

PIPTOCLAINA *supina*. Hardy annual. Seed. Common soil.

PIQUERIA *trinervia*. Hardy herbaceous. Division. Light rich loam.

PISCIDIA. Jamaica Dogwood. Two species. Stove evergreen trees. Cuttings. Light loam.

PISCINARY is another name for a fish pond, which in landscape gardening comes under the general terms *Water and Pond*, which see.

PISTACHIA. Four species and more varieties. Hardy and half-hardy evergreen and deciduous trees. Lay-

ers and ripe cuttings; light rich loam.

Even the hardy species of this genus do best against a wall.

PISTORINIA *hispanica*. Hardy biennial. Seed. Light well-drained soil.

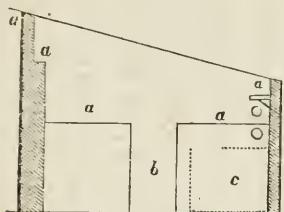
PISUM. Pea. Seven species and many varieties. Hardy annual climbers, except the herbaceous perennials, *P. americanum* and *P. maritimum*. Seed. Rich dry soil. See *Pea*.

PIT, *in the Conservatory*, is the body of soil in which the shrubs, &c., are planted; *in the Stove*, it is the excavation in which is the tan, or other material for plunging the pots; and *for Forcing*, it is a structure having a glass roof, and differing from a forcing frame only in being larger, and with sides fixed to the soil. Pits for this purpose were usually sunk in the ground; but

it has been justly observed, that "sunken pits are inconvenient to get at; there is no pulling their sashes off and on with ease, and ventilation is troublesome. Then, again, in spite of all that can be done, they will always be damp; and although this is advantageous for some purposes, it is destructive to green-house plants in long winters. Upon the whole, the inconveniences are at least as considerable as the advantages. We doubt whether sunken pits can often be recommended in gardens."—*Gard. Chron.*

Under the various titles *Melon*, *Cucumber*, *Pine Apple*, &c., descriptions of pits suitable for their cultivation will be found. The following outline is of one for various purposes, strongly recommended by Mr. R. Fortune, gardener at the Chiswick Gardens :

Fig. 129.



a, stages and back and front shelf; *b*, passage along the middle; *c*, proposed tank; *d*, proposed ventilators.

The width of the pit is nine feet; and, as the sketch is drawn from measurement, any one may easily ascertain the different proportions.

The two stages are made of wood, having cross bars, as seen at *a*, and upright bearers on each side of *b*. The small shelf in front is supported by a bracket, which also supports the hot water pipes; and the back shelf might be supported in the same manner, although in this instance it is formed out of the thickness of the back wall. The only improvement in its construction, is to have a large tank in some convenient place in front, as at *c*, to receive the rain which falls on the roof; and also some wooden ventilators in the back and front wall at *d*, which could be opened at those times when it is not prudent to draw down the sashes. By having the

door in the back wall, and the passage along the middle, a person can go in at any time without pushing down the sashes, and reaching from the back to the front, he can water or do anything else the plants may require.

"This pit is extremely useful for raising seeds, or for growing small green-house plants, and keeping such things as verbeneas, petunias, and scarlet pelargoniums, for turning out into the flower garden during the summer months; or by dividing it into two parts by a partition, having a door in it, one half may be used for striking cuttings, raising seeds, or keeping plants, which have been newly potted off, and the other filled with well established plants, requiring more light and air; so that, with a little contrivance, it is astonishing how many things the amateur may do in a small place like this."—*Gard. Chron.*

PITCAIRNIA. Seventeen species. Stove herbaceous. Seed and suckers. Moss potsherds. They are really epiphytal.

PITCHER-LEAF. *Nepenthes phyllamphora*.

PITCHER-PLANT. *Nepenthes distillatoria*.

PITTOSPORUM. Eighteen species. Green-house evergreen shrubs, except *P. tobira*, which, matted, will sustain the winter south of Virginia. Ripe cuttings. Peat and loam.

PLADERA. Two species. Green-house biennials. Seed, and cultivated like the *Balsam*.

PLAGIOLOBIUM. Two species. Green-house evergreen shrubs. Young cuttings. Sandy loam and peat.

PLASTER OF PARIS. See *Gypsum*.

PLANERA. Two species. Hardy deciduous trees. Layers on grafts of the elm. Light loam, near water.

PLANE TREE. *Platanus*.

PLANK PLANT. *Bossia scolopendria*.

PLANTAIN TREE. *Musa*.

PLANTATION. The ornamental distribution of trees is considered under the titles *Clump*, *Wood*, &c.; and here will be considered only a few practical details relative to the planting and management of trees.

Selection.—Our guide in this must be the nature of the soil. If chalk is a principal constituent of this, the beech, birch, and ash must be the trees chiefly

adopted; if clay, the oak; if rich loam, the elm. In moist situations, the alder, willow, and poplar; and in mountain, and dry soiled districts, all the hardy conifers, the birch and the ash. Peat, if well drained, will bear the Scotch fir; and the Spanish chestnut will flourish on light sheltered loam. On the poorest and lightest soils, if well drained, the larch will establish itself. Similar attention must be paid to the soil in locating the shrubs. Rhododendrons delight in shade and leaf-mould; and others have their particular soils, of which information will be found in other pages, under their appropriate titles.

Manures.—Trees, like all other plants, are benefited by being appropriately manured; their growth is thus accelerated, and contrary to old opinions, it is found that the wood of quickly-growing trees is more durable, and more tough than that of trees of the same species which have vegetated more tardily. Calcareous matter is always required by trees; and my brother, Mr. Cuthbert Johnson, has truly stated that on the poor hungry heath lands, such as those of Norfolk, Surrey, and the north, which contain hardly a trace of carbonate of lime, they find that, by dressing with chalk or marl, land intended for planting, the growth of the trees is very materially increased; and more recently, as in the forest of Damaway in Scotland, the planters have found the greatest advantage from placing only a handful of lime (about four bushels per acre is sufficient) in the soil under the plants. By this means the young trees, they say, are forced forward; that is, they are supplied with the carbonate of lime at the very period of their growth, when their roots, from want of extent and vigour, are least able to absorb from the soil the portion of this earth so essential for their healthy growth. And it is precisely such heath soils as those to which I have alluded as being so materially benefited by the application of lime, chalk, or marl (which also contains chalk), that are found, when examined in their natural state, to be nearly destitute of carbonate of lime.

It is for the same reasons that, in the early state of their growth, timber plantations are benefited so materially by being manured with organic matters—a fact well known to those who

plant for merely ornamental purposes; and it is because all timber trees contain phosphate of lime in very considerable proportions, that crushed bones are found to be so excellent a fertilizer for them; and hence one reason, why it has long been a well-known fact, that by burying dead animals under trees nearly exhausted for want of nourishment, those trees will almost invariably be considerably revived, and send out their shoots with unusual vigour; and how essential the presence of phosphate of lime is to their growth, may be judged of from the fact, that this salt constitutes 45 per cent. of the ashes of the oak; 35 in those of the hazel; 16.75 of the poplar; 23 in the hornbeam; 12 per cent. in those of the fir.

These chemical examinations naturally support the conclusion to which I have long come in my own experiments, that in all plantations of timber trees, both on the score of profit and of ornament, it is in almost all situations desirable to assist the growth of the young trees by a small addition of manure. On a large scale this must be chiefly confined to the use of the earths, either lime, chalk, or marl, according to their respective local value; and for this purpose a smaller proportion per acre of any kind of manure is of much greater value than is commonly supposed. I have usually, under every plant, merely applied a small shovelful of tolerably-rotted stable dung, stirring it up with the mould; and, as these experiments were principally made on a poor hungry gravelly soil, nearly destitute of carbonate of lime, I have usually added to the beach plants, instead of the farm-yard manure, a small quantity of chalk.

Trenching.—In preparing the land for plantations, the same chemical examination of the composition well illustrates the advantages derived by the plant, from merely previously stirring the soil; since it is evident that when the constituents of the young trees are contained in it in only very limited proportions, in such case the more easily their roots are enabled to penetrate in search of that necessary nourishment, the more rapid will be their growth.

Previous trenching of the soil also conduces to the healthy growth of trees in more ways than one. It renders them less subject to injury from want

of moisture in the heats of summer; the atmosphere more freely finds access to their roots; and not only yields its watery vapour in the warmest weather for their service, but its gases, so essential to their very existence, are also in a similar manner more readily absorbed.

Draining.—The most neglected, yet most important, of all the branches of forest culture, is draining. This ought to be done thoroughly before planting; but if it has been neglected, may be done at any time, the sooner the better, and the effects will surprise, in a year or two, even the most sanguine. I have seen larch plantations, by draining only, converted from sickly worthless trees to thriving valuable woodlands.

Planting.—"Too little attention," Mr. C. Johnson justly observes, "is usually paid by planters in the choice of their plants, the manner in which they have been reared, and in the care of their removal. Instead of attending to the acquired habits of the tree, it is a very common practice for the plants to be bought of some nurseryman who has reared them in a warm rich bottom, and then, as a natural consequence, when the trees are transplanted to a cold, poor, hungry, exposed soil, a large proportion of them are sure to perish, or, if they live, many become stunted or stag-headed.

"There are other very common errors, of which I have long noticed the ill effects; for instance, the want of care with which the roots of the young trees are deposited in the earth, and the unnecessary length of time which is suffered to elapse between the period when the plant is taken from the nursery and replanted. I have always found the good effect of causing the roots of the young plant to be carefully arranged and spread out before the earth is thrown in upon them—the usually heedless way in which the roots are thrust into the hole, and perhaps broken or materially bruised in the act of treading in the earth upon them, is of necessity prejudicial to the young plant; and then, again, a still more negligent practice, that of ploughing in the young trees, is too often adopted on a large scale, by which the plants are still more hastily deposited in the soil, and are neither fixed with sufficient firmness in the ground, nor even

placed in an upright position."—*Farm. Enc.*

There is certainly no economy in this hasty mode of planting; the trees perish in great numbers; they linger for years without vigour; have to be replaced at a considerable expense; and, in the mean time, the owners lose all the advantage which might have been ensured from a more skilfully obtained rapidity of growth. In planting on a large scale, the same pains and care should be taken as in inserting a shrub in the parterre.

Pruning.—If care be taken to rub off ill-placed shoots in the early stages of a tree's growth, no after-pruning—no extensive application of the knife and saw—will be required, except in case of casualties. When a large branch requires amputation, it is best to leave a stump projecting a full foot from the stem. The face of the wound should be towards the ground, and the edges trimmed smooth with a very sharp knife.

PLASHING is "a mode of repairing or modifying a hedge by bending down a portion of the shoots, cutting them half through near the ground to render them more pliable, and twisting them among the upright stems, so as to render the whole more effective as a fence, and at the same time preserve all the branches alive. For this purpose the branches to be plashed, or bent down, must not be cut more than half through, in order that a sufficient portion of sap may rise up from the root to keep alive the upper part of the branches.

"Where hedges are properly formed and kept, they can very seldom require to be plashed."—*Farm. Enc.*

PLATANThERa. Thirteen species. Hardy orchids, except the stove, *P. susanna*, and the green-house, *P. flava*. Seed. Loam, peat, and chalk.

PLATANUS. Plane-Tree. Two species and three varieties. *P. orientalis* does not suffer from the disease which has of late years attacked one indigenous species. Hardy deciduous trees. Layers, cuttings, and seed. Common light soil.

PLATYCARPIUM *orinocense*. Stove evergreen tree. Cuttings. Peat and loam.

PLATYCHILUM *celsianum*. Green-house evergreen shrub. Young cuttings. Sandy loam and peat.

PLATYLOBIUM. Six species. Green-house evergreen shrubs. Seed. Sandy peat and a little loam.

PLATYLOPHUS trifolius. White ash. Green-house evergreen tree. Ripe cuttings. Loam and peat.

PLATYSTEMON. Two species. Hardy annuals. Seed. Sandy loam.

PLATYSTIGMA lineare. Half-hardy herbaceous. Division. Sandy loam.

PLATYSTYLIS. Three species. Hardy herbaceous. Division and seed. Light loam.

PLEASURE-GROUND is a collective name for that combination of parterres, lawns, shrubberies, waters, arbours, &c. which are noticed individually in these pages. One observation may be applied to all—let congruity preside over the whole. It is a great fault to have any one of those portions of the pleasure ground in excess; and let the whole be proportioned to the residence. It is quite as objectionable to be over-gardened as to be over-housed. Above all things eschew what has aptly been termed gingerbread-work. Nothing offends a person of good taste so much as the divisions and sub-divisions we are sometimes compelled to gaze on “with an approving smile.”

PLECTRANTHUS. Six species. The annual and biennial species by seed; the shrubs and herbaceous by cuttings. All in rich light loam. They are all tenants of either the green-house or stove.

PLECTRITIS congesta. Hardy annual. Seed. Common soil.

PLECTRONIA corymbosa. Green-house evergreen tree. Cuttings. Loam and peat.

PLEROMA. Four species. Stove evergreen shrubs. Young cuttings. Sandy loam and peat.

PLETHORA. See *Extravasated Sap*.

PLEURANDRA. Seven species. Green-house evergreen shrubs. Ripe cuttings. Sandy loam and peat.

PLEUROTHALLIS. Twenty-three species. Stove epiphytes. Division. Wood and moss.

PLOCAMA pendula. Green-house evergreen shrub. Cuttings. Loam and peat.

PLOUGHMAN'S SPIKENARD. *Baccharis*.

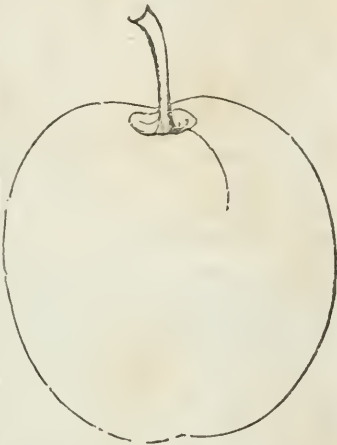
PLUM. *Prunus domestica*.

Varieties.—One hundred and twenty-seven are cultivated in the Gardens of

the London Horticultural Society at Chiswick. The following limited, though select number, we extract from the catalogue of the old Landreth Nurseries. (See p. 466.)

The descriptions and cuts of a few choice kinds may aid those about to plant, in selecting with advantage.

Fig. 130.



WASHINGTON. (*Bolmar's Washington*.) (Fig. 130.) “This is an American seedling, accidentally produced in the city of New York. Its great size and beautiful appearance, at once introduced it into general culture; it must be confessed, there are many of greater merit, though but few of more prepossessing aspect.

“Skin yellow, or yellowish-green, when fully matured dotted with red. Flesh yellow, separating freely from the stone. The tree is of vigorous growth, hardy, and well suited to our climate.”—*Rural Reg.*

COLUMBIA. (Fig. 131.) “An admirable plum, well worthy of its name; raised by Mr. Lawrence, of Hudson, New York, who has doubly served us by producing another first rate plum, ‘Lawrence's Favorite.’ The Columbia is a free bearer, fruit of the first class, both as regards size and quality. Skin purple, abounding in bloom. Flesh orange. Ripe at Philadelphia close of August.”—*Rural Reg.*

PLUMS.—EXPLANATION OF ABBREVIATIONS.—*Colour*—y yellow; b blue; r red; p purple. *Size*.—L large; M medium.

** American Seedlings of acknowledged merit.*

NAME.	COLOUR.	FORM.	SIZE.	QTY.	SEASON.
Apricot plum	y	round	L	2	August
*Bingham's Egg	y	oval	L	1	August
*Bolmar's Washington	y	oval	L	1	September
*Bleeker's Red	r	round	M	1	August
Blue Gage	r	round	M	1	August
*Brevoort's Purple	p	oval	L	1	September
*Bleeker's Gage	y	round	L	1	August
Coe's Golden Drop	y	oval	L	1	September
*Cooper's Red American	p	oval	M	1	September
*Columbia	p	round	L	1	August
Damson, Yellow	y	round	M	2	September
Gage, Yellow	y	round	M	1	September
*Gage, Scarlet	r	oval	M	2	September
*Gage, Schuyler's	y	round	L	1	August
*Gage, Prince's Imperial	g	oval	M	1	August
Goliah	p	oval	L	2	August
*Huling's Superb	y	round	L	1	August
*Jefferson	y	oval	L	1	September
Red Magnum Bonum	r	oval	L	1	August
White Magnum Bonum	w	oval	L	1	August
Morocco Plum	p	round	M	1	August
Nectarine Plum	p	round	L	1	August
Orleans, Red	r	round	L	1	August
Orleans, Early	p	round	L	1	August
Prune, German	p	oval	L	1	September
*Verplanck's Purple	p	round	M	1	August

Fig. 131.—(P. 465.)

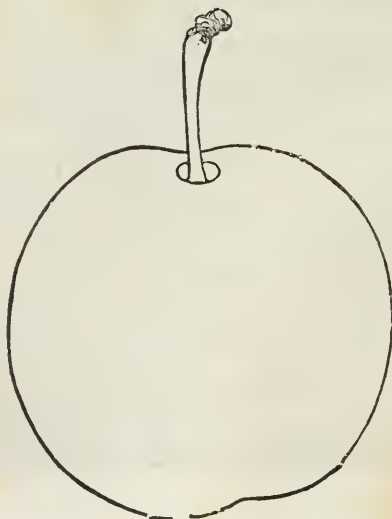
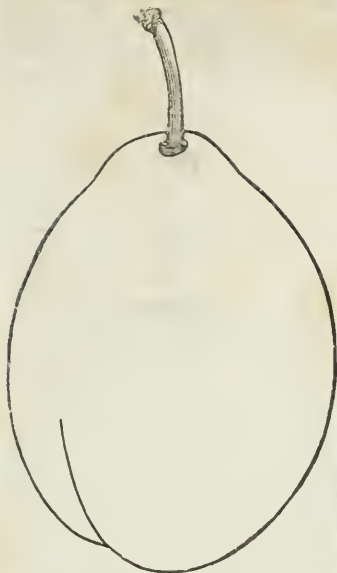


Fig. 132.

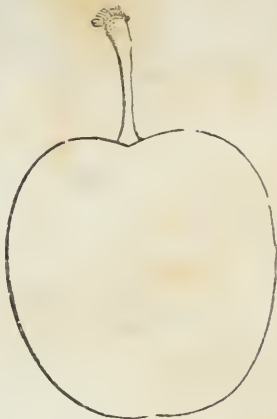


COE'S GOLDEN DROP, of Hooker, Lindlay, and others.—Coe's Imperial, Coe's Seedling, &c. (Fig. 132.) "Mr. Coe, a market gardener of Norfolk, England, who raised this plum, has perpetuated his name by association with it. Many varieties have been subsequently produced, but few of them have as high claims to regard, as the *Golden Drop*—indeed it has been pronounced superior to any late plum cultivated in Britain.

"The fruit is of extra large size, rich, and in the opinion of competent judges, not inferior to the celebrated *Green Gage*, to approach which in quality, is usually deemed high merit. Skin greenish yellow, spotted on the sunny side with violet and crimson. Flesh firm, adhering to the stone. The tree is of vigorous habit, and has proved well suited to the middle States."—*Rural Reg.*

IMPERIAL GAGE, (*Prince's Imperial*.) (Fig. 133.) "This is a seedling from the *Green Gage*, raised by the late Mr. Prince, of Flushing, New York, and has received much praise. The tree is of robust habit; fruit larger than the *Green Gage*, and of good quality. Ken-

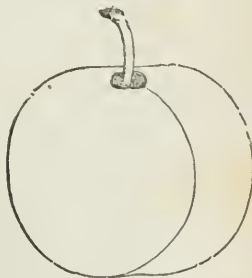
Fig. 133.



rick cites a single tree at Charlestown, Mass., the fruit of which, for several successive years, sold for \$40 to \$50. Downing says it is particularly fitted for light dry soils, and that on heavy lands it is often insipid.

"Skin light green, when fully matured inclining to yellow, with a profusion of bloom. Flesh green, and of a sprightly flavour. Ripens at Philadelphia late in August. It is a liberal bearer, and may be safely recommended as a desirable variety."—*Rural Reg.*

Fig. 134.

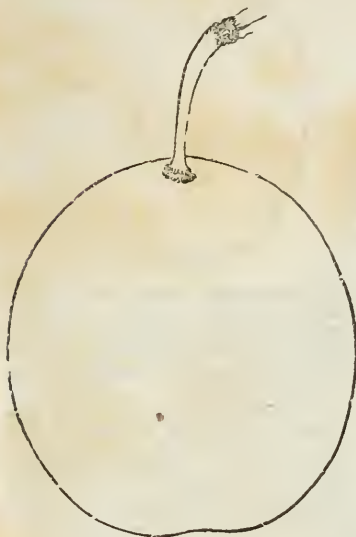


GREEN GAGE, of the English and American gardens. (Fig. 134.) There is no plum better known (and none more worthy of being known) than the *Green Gage*, which derived its name

from a family of the name of Gage who obtained it in France, where it is popularly termed the Reine Claude, (or Queen Claude,) after the wife of Francis I. Those qualified to give an opinion on the subject, have declared it to be

the best plum known in England. The size is below medium. Skin green, inclining to yellow when fully ripe, and occasionally marbled with red. Ripe middle of August.

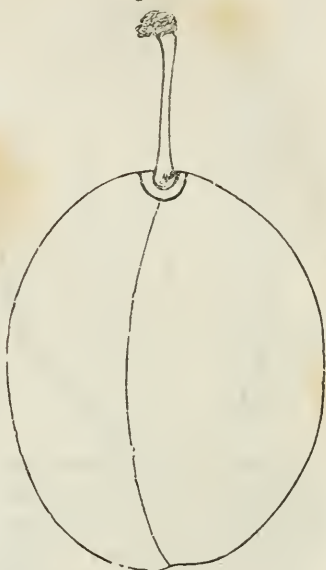
Fig. 135.



JEFFERSON. (Fig. 135.) This excellent variety is the product of the late Judge Buel of Albany, so long and so favourably associated with the "Cultivator." Mr. Downing, whose opinion has great weight with us, says, if he were asked which he thought the most desirable and the most beautiful of all dessert plums, he should undoubtedly give the name of this new variety. He thinks it, when fully ripe, nearly if not quite equal in flavour to the Green Gage—"it is as large as the Washington, more richly and deeply coloured, being dark yellow, uniformly and handsomely marked with a fine ruddy cheek. It is about ten days or a fortnight later than the Washington, ripening the last of August, when it has the rare quality of hanging long on the tree, gradually improving in flavour."—"Fruits of America."

MAGNUM BONUM, (Yellow Egg.) (Fig.

Fig. 136.



136.) These are the two popular names for a variety very generally cultivated in France and England, and known to a considerable extent in the gardens of our sea-board. It is an attractive variety, and though by no means equal in point of quality to many less prepossessing, is nevertheless in high repute. Skin yellow. Flesh closely united to the stone, sub-acid until dead ripe, when the flavour is highest. It is an excellent preserving plum—its large size adding to its merit in that particular.

Propagation by Seed.—This mode is adopted for raising stocks and new varieties. For the latter purpose cross-impregnation has been successively pursued, attention being paid to the suggestions offered under the title *Hybridizing*. Sow in October, in rich light loam, in drills twelve inches apart and two inches deep, when two-year

old buds may be taken from them and inserted on older trees early, to ascertain the value of the fruit. At two years old they are also fit to be stocks for budding or grafting.

Grafting and Budding.—The former is to be done in July or March, and the latter in July or August.

Suckers.—Damsons and bullaces are usually raised in this mode, without grafting or budding.

Layers of the young wood may be made at any time between November and March. In twelve months they are established, and may be separated from the parent.

Planting and Culture.—The season for planting all the sorts of plum-trees, is any time in open weather, from the fall of the leaf until the approach of vegetation in spring.

"The trees of all the varieties will succeed in any common soil, and in any open exposure. Those for walls should generally have an east or southwest wall for some of the choicest sorts; and some may also be planted against a north wall, to furnish some late fruit; and those for espaliers may be planted around any of the open quarters, as may also the standards.

"Plant the wall and espalier trees eighteen feet distance; though if the walls, &c., are rather low, twenty feet distance will be requisite, that, in default of a proper height of walling, there may be more scope to train the branches horizontally. If the trees thus planted are quite young, being only of one year's shoot from the grafting or budding, they should, in March, be headed down to four or five eyes, to force out lower horizontals in the ensuing summer, which, according as they advance in length, train them in horizontally at full length, unless you would forward a further supply of lower branches as fast as possible, when you may pinch the young shoot, in May, down to a few eyes. Each will throw out several laterals the same year, which train also horizontally at full length during the summer's growth; and in winter pruning cut not only any fore-right and back shoots, but train in all the regular ones at full length; for the branches of these trees must be shortened only occasionally, to procure wood to fill vacancies; because the branches always form fruit spurs first towards their extreme parts,

which would be destroyed by shortening. So that, after having shortened the first and second year's shoots occasionally as above, and thereby procured a proper set of lower horizontals, to give the head its first form, let the whole then be trained in entire, about four, five, or six inches asunder; and, according as the trees shoot every summer, train in a necessary supply of the regular shoots to fill the wall, &c.; at the same time retrench superfluities and irregular wood—still at full length at the above distance. For all plums bear principally upon spurs half an inch or an inch long, arising from the sides of the branches, from one or two to many years old. When trained, always at full length; but, if shortened, they would throw out a multiplicity of useless wood, and hardly any fruit-spurs.

"The wall and espalier plum-trees should be pruned every summer and winter.

"Standard plum-trees may be trained both as full standards and half-standards, budding or grafting the former six feet high, and the latter only three or four; or both kinds may be worked low in the stock, and the first shoot trained to those heights for a stem, then let them branch away and form a head. These standards may be planted both in the garden and orchard, at from about twenty to thirty feet distance."—*Abercrombie*.

Forcing.—To obtain an early crop, in March or April, trees planted in large tubs are to be preferred; but for the general crop, in May or June, the trees are best planted in the borders of the stove. Mr. Loudon says that:—

"For a crop to ripen in the second week in May, the house must be covered in early in January, commencing with a temperature of 42° of Fahrenheit for the first fortnight; after which the heat may be gradually raised to 52°, at which it may continue until the flowers make their appearance. During this time frequent changes of air must be admitted to strengthen the bloom; and the crop will be rendered more certain by keeping the trees in blossom, as long as possible, by light shading where necessary; and when the petals begin to fall, gentle dews may be raised from the surface of the mould. As the fruit forms, the thermometer should be raised to 58°. This must be done gradually,

as the consequence of a rapid rise may be a casting of the fruit. During the progress of shooting great care must be taken against sudden variations of the temperature, water very sparingly used, and every check, by fumigation, be given to the various insects, which will be particularly active at this period.

"When the fruit is safely stoned, a moderate dressing of rotten manure may be spread on the surface of the mould, the heat increased to 68°, and a more liberal supply of water given.

"After the fruit has obtained a full size, and approaches maturity, air may be freely admitted, and water should be given in less quantities, and finally discontinued a few days before gathering."—*Enc. Gard.*

PLUMBAGO. Eleven species. Some hardy herbaceous, others stove and green-house evergreen shrubs and climbers. *P. capensis* produces a good effect when plunged or planted out on a rich border during summer. *P. rhombifolia* is a stove annual; this is propagated by seed, the others by cuttings, and all in common soil.

PLUMIERIA. Twenty-two species. Stove evergreen shrubs and trees. Large cuttings, slightly dried. Sandy loam, and a little peat.

POCOCKIA cretica. Hardy annual. Seed. Common soil.

PODALYRIA. Thirteen species. Green-house evergreen shrubs. Cuttings. Sandy loam and peat.

PODANTHE. Seven species. Stove evergreen shrubs. Cuttings in spring, slightly dried. Sandy loam and lime rubbish.

PODANTHUS mitiqui. Hardy evergreen shrub. Cuttings. Loam and peat.

POD-FERN. *Ellobocarpus*.

PODOCARPUS. Eleven species. Green-house and stove evergreen trees. *P. chinensis*, *P. macrophyllus*, *P. nucifer*, and *P. verticillatus*, are quite hardy, if grown in a light-soiled border, sheltered from the north and east, and well drained. Cuttings. Light loam, and a little peat.

PODOLEPIS. Five species. Hardy herbaceous. Seed and division. Sandy loam and peat.

PODOLOBIUM. Five species. Green-house evergreen shrubs. *P. scandens* is a climber. Young cuttings. Sandy loam and peat.

PODOPTERUS mexicanus. Green-

house evergreen shrub. Young cuttings. Loam and peat.

PODOSPERMUM. Nine species. Hardy herbaceous, biennial, and annual. The first is increased by division, and all by seed. Common soil.

PŒCILOCAMPA populi. December Moth, is found in this month in orchards sticking against the trunks of trees. The wings are about an inch and a quarter broad, and of a chestnut brown in colour: on the upper pair there is a pair of incurved bands, and a wavy one near the centre; the wings have also a grayish or brownish fringe. The lower pair are brown. The caterpillar is ashy gray at the sides, and rather darker on the back, and it has four red spots on each segment; at first these caterpillars are gregarious, under a silken tent, from which they issue at night to feed, but after a little time they become solitary. They feed on various kinds of fruit trees in the early part of the summer, and when full grown, they spin a silken case in which they change the pupæ. The December Moth is not one of the most injurious to fruit trees, but still, in localities where it is found in tolerable abundance, the caterpillars do considerable damage to the leaves. Hand picking when the caterpillars are living in society, is the best means of diminishing them.—*Gard. Chron.*

POET'S CASSIA. *Osyris*.

POGONIA. Three species. Hardy orchids. Offsets. Sandy peat.

POGOSTEMON plectranthoides. Stove evergreen shrub. Young cuttings. Rich sandy loam.

POINCIANA. Five species. Stove evergreen shrubs. Seed and cuttings. Rich light soil.

POINSETTIA. Two species. Stove evergreen shrubs. Cuttings of previous year's shoots, slightly dried. Rich sandy loam. Of these plants the most beautiful is *P. pulcherrima*. On the cultivation of this we have the following directions from Mr. W. Tillery, the gardener at Welbeck:—

"Raise the plants from single eyes, (like vines), from the hard ripened wood of last year, and re-pot them in sandy loam and leaf-mould; keeping them in a cucumber-frame, and then in a low stove, as near the glass as possible. They do pretty near the glass and not drawn, and then put into the stove in September, watering freely when in

flower. Old plants that have been cut down, never have the floral leaves as large as a young plant raised from eyes or cuttings with one stem."

The following additional instructions are given by Mr. D. Beaton, gardener to Sir W. Middleton, at Shrubland:—

"As an additional means of improving the size of the flowers, a strong healthy plant, not less than two years old, should be kept to propagate from by eyes. This plant should be kept in the stove all summer, encouraged during its growth by all safe stimuli, and have only two or three of its strongest shoots allowed to remain. When these shoots have nearly done growing, cut off their tops, that the plant may throw all the strength of its vital energies into those eyes destined for your next year's plants.

"When the young wood ripens, allow the plant to go gradually to rest, and when you cease watering it, place it in a dry part of the stove; should it offer to vegetate too soon in spring, remove it to a dry place in the greenhouse to keep it back. About the beginning or middle of April will be quite time enough to begin to propagate it. At that time take the most prominent eyes from the ripest portion of the branches.

"Cut the old plant down to the former year's wood, shake off all the soil from its roots, cut away all decayed roots, and shorten the strongest ones; repot it in as small a pot as you can put its roots into, and place it in bottom heat; treat it with due care as in the former season, and for the same purpose."—*Gard. Chron.*

Aphelandra cristata may be managed the same way, and no plant will more amply repay the care and attention bestowed on it.

POIRETIA scandens. Stove evergreen climber. Young cuttings. Loam and peat.

POISON-BULB. *Brunsvigia toxica-ria*, and *Crinum asiaticum*.

POISON-NUT. *Strychnos nuxvomica*.

POISON-OAK. *Rhus toxicodendron*.

POISONOUS PLANTS. Gardeners should be much more careful than they usually are in handling the plants they cultivate, for many of them have deadly qualities. M. Neumann, chief gardener of the Paris Jardin des Plantes, says

that pruning knives and hands washed in a tank after they have been employed upon some of the exotics, will destroy the fish it contains. Hippomane biglandulosa, the Manchineel, the Tanghin, Sapium laurocerasus, and Cainocladia dentata, are equally deleterious to man. Gardeners who have merely rubbed the leaves of the latter between their fingers, have had swollen bodies and temporary blindness. Wounds from pruning knives smeared with the juices of such plants, are like those from poisoned arrows.

POISONS. Soils containing obnoxious ingredients are certain introducers of disease and premature death. An excess of oxide of iron, as when the roots of the apple and pear get into an irony red gravelly subsoil, always causes canker to supervene. In the neighbourhood of copper-smelting furnaces, not only are cattle subjected to swollen joints and other unusual diseases, causing decrepitude and death, but the plants also around are subject to sudden visitations, to irregular growths, and to unwarmed destruction; and a crop once vigorous will suddenly wither as if swept over by a blast. There is no doubt of this arising from the salts of copper, which impregnate the soil irregularly, as the winds may have borne them sublimed from the furnaces, and the experiments of Sennebier have shown that of all salts those of copper are the most fatal to plants. That they can be poisoned, and by many of those substances, narcotic as well as corrosive, which are fatal to animals, has been shown by the experiments of M. F. Marcet.

The metallic poisons being absorbed, are conveyed to the different parts of the plant, and alter or destroy its tissue. The vegetable poisons, such as opium, strychnia, prussic acid, belladonna, alcohol, and oxalic acid, which act fatally upon the nervous system of animals, also cause the death of plants.

The poisonous substance is absorbed into the plant's system, and proves injurious when merely applied to its branches or stem, almost as much as if placed in contact with the roots. Ulcerations and canker are exasperated if lime be put upon the wounds, and when Dr. Hales made a golden renet apple absorb a quart of camphorated spirits of wine through one of its

branches, one-half of the tree was destroyed.—*Princ. of Gardening.*

POIVREA. Six species. Stove evergreen climbers. Young cuttings. Sandy loam and peat.

POLANISIA. Five species. Hardy annuals. Seed. Sheltered, light rich loam.

POLEMONIUM. Twelve species. Hardy herbaceous. Division. Light loam.

POLIANTHES. Tuberosc. Two species. Green-house bulbs. Bulbs imported. Sandy loam and leaf-mould.

POLYANTHUS. *Primula vulgaris*, var. *polyantha*. A florist's flower much esteemed in England; in the United States but little attention has been paid to it.

Varieties.—Mr. Slater, florist, of Manchester, gives the following lists:—

FIRST CLASS.

Barrow's Dutchess of Sutherland.
Buck's George the Fourth.
Bullock's Lancer.
Clegg's Lord Crewe, alias George Canning.
Collier's Princess Royal.
Cox's Regent.
Crownshaw's Invincible.
Eckersley's Jolly Dragoon.
Gibbon's Sovereign.
General Bolivar.
Gond's Independent.
Hetcher's Defiance.
Hilton's President.
Hufton's Earl Grey, alias Clegg's Lord John Russell.
Hufton's Lord Ranccliffe, alias Clegg's Prince of Orange, and Clegg's Golden Hero.
Hufton's Lord Lincoln.
Maude's Beauty of England.
Nicholson's Bang Europe.
Ollier's Beauty of Over.
Pearson's Alexander.
Saunders's Cheshire Favourite.
Wood's Espartero.

SECOND CLASS.

Beauty of Coven.
Buckley's Squire Starkie.
Burnard's Formosa.
Dew's Britannia.
Faulkner's Black Prince.
Fillingham's Tantarara.
Queen's Earl Fitzwilliam.
Hepworth's Elizabeth.
Jolly Sailor.

Nicholson's Ranger.

———— Nonsuch.

———— King.

Sir Sidney Smith.

Telegraph (Head's).

Turner's Emperor Buonaparte.

———— Princess.

Timms's Defiance and Yorkshire Regent.

Characteristics of Excellence, are thus enumerated by Dr. Lindley:—

"The pip of the Polyanthus should be large, and the nearer the outline approaches a circle the better; it should be free from any unevenness, and lie perfectly flat; the edge must be smooth, and the divisions in the corolla, which form it into heart-shaped segments, should reach the eye but not cut into it. The segments should be well rounded, making the divisions between them small and shallow. The tube must be of a fine yellow, round, clearly defined, well filled with anthers, and terminating in a narrow ridge raised slightly above the surface of the eye.

"The eye should be of a bright rich yellow colour, of a uniform width round the tube. The ground colour must be entire, free from specks or blemishes, of a dark or rich crimson, not paler at the edges, and uniform in every division. The edge should form a narrow well defined rim of yellow, perfectly regular, bordering each segment, and passing down the centre of each division to the eye.

"It is essential that the edge and the eye be of a uniform yellow. These qualities in the pips, and the flowers forming a compact truss, standing well above the foliage on a firm upright stem, will constitute perfection in the polyanthus."—*Gard. Chron.*

Propagation by Seed.—Dr. Lindley says, "during February sow in pots in a light and moderately rich soil, and give the seed, when sown, a slight covering of sifted soil; the pans should then be placed under hand-glasses. It is better to raise them without bottom-heat, as the young plants are apt to damp off. As soon as the seeds begin to vegetate, air should be given; and as they increase in size, care must be taken to keep away slugs. When the sun has much power, it will be advisable to remove the pans to an east or north aspect, to prevent them from be-

coming too dry. In August they will be ready for transplanting." — *Gard. Chron.*

General Culture.—This is detailed by that most successful floriculturist, Dr. Horner, of Hull, and from his directions are taken the following extracts:—

"Situation and Soil.—A free and pure air is necessary for its vigorous growth. It should always be grown in a bed or open border, and in one which has an eastern aspect. It is most impatient of heat and drought, but delights in a cool, or rather moist and shaded locality, where it can enjoy about two hours of the morning sun. It thrives best in a retentive soil from a rich old pasture, to which has been added about the sixth part of cow manure, two or three years old, and the same quantity of leaf-mould. The natural soil of the garden should be dug out to the depth of a foot, and the space filled up with the above, three months previously to planting them, that the bed may have become settled before it is required for the plants.

"Planting.—The proper time is at the end of July, not later. Shorten the main or tap-root, as it is called, to within about half an inch of the leaves, that a few of the vigorous young fibrous roots only may be retained; with a small trowel make a hole in the soil sufficiently deep that the plant may have the very crown of the main root covered at least one inch with the soil.

"It is of the utmost importance that the polyanthus should be thus deep set; for the young roots always emanate from the very top of the main root, and throw themselves out for the most part, if a somewhat curved or horizontal method of planting is adopted.

"Having well watered the bed, the plants require no more care whatever, except being kept clean. They should be left entirely without covering or protection in the winter.

"Blooming, &c.—In spring, just when the pips are about to expand, if wanted for the purpose of exhibition, or to ornament the stage or cool greenhouse, they may be taken up with a moderately-sized ball of earth, and put into common auricula pots, for they bear this removal without the slightest injury or apparent check. Water must now be supplied rather freely, and

should occasionally be sprinkled over the foliage (avoiding the flowers); and the smaller and central pips should be thinned out, that the truss or umbel of flowers may have a uniform and uncrowded appearance. When the bloom is over, the plants should be turned out of their pots into the border from whence they were taken; here they must remain without further care, except an occasional watering, till the end of July, when they should be taken up, the soil crumbled from their roots, and those which present two or more heads divided gently with the fingers, and prepared and planted as before described." — *Gard. Chron.*

POLYBOTRYA. Three species. Stove ferns. Division and seed. Sandy peat and turf.

POLYGALA. Forty-four species. Herbaceous, shrubby, and annual. All hardy or green-house, except the stove annuals, *P. paniculata* and *P. umbellata*. Division, cuttings or seed. Sandy peat and a little loam.

POLYGONATUM. Thirteen species. Hardy herbaceous. Seed and division. Light rich loam.

POLYGONUM. Forty-eight species. Chiefly hardy herbaceous or annual plants, some being aquatics and trailers. A few require the shelter of the greenhouse. Seed and division. Light rich loam.

POLYPODIUM. Sixty-six species. Chiefly stove ferns. Division and seed. Light loam and peat.

POLYPODY. *Polypodium*.

POLYPTERIS *integrifolia*. Hardy annual. Seed. Light rich loam.

POLYSPORA *axillaris*. Stove evergreen shrub. Unripe cuttings. Light loam and peat.

POLYSTACHYA. Seven species. Stove epiphytes. Division. Wood and moss.

POMADERIS. Sixteen species. Green-house evergreen shrubs. Young cuttings. Sandy loam and peat.

POMAX *hirta*. Green-house evergreen shrub. Cuttings. Sandy peat and loam.

POMBALIA *ituba*. Stove herbaceous. Seed and young cuttings. Sandy loam and peat.

POMEGRANATE. *Punica*.

POMPION. See *Gourd*.

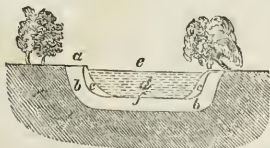
PONCELETTIA *sprengeloides*.

Green-house evergreen shrub. Young cuttings. Sandy peat.

PONDS, are reservoirs of water dug out of the soil, and made retentive by puddling with clay their bottoms and sides.

Puddling is necessary in almost all instances and the mode of proceeding is thus detailed by Mr. Marnock, in the *United Gardeners' Journal*. When the excavation is formed, or partially so, the bottom puddle near the outer edge is formed, and upon this is raised the upright or side puddle; and as this proceeds the ordinary clay or earth is raised at the same time, and by this means the upright puddle is retained in its place; and ultimately the sides, being formed in a sloping direction, admit of being covered with gravel or sand, and may be walked upon, or stakes may be driven to a considerable depth without reaching the puddle or in any way injuring it; this can never be the case if the puddle, as is sometimes done, be laid upon the sloping side of the pond. The sides may slope rapidly, or the reverse: if the slope be considerable, sand or gravel to give a clean appearance will be the more likely to be retained upon the facing; plants can be more easily fixed and cultivated; gold-fish also find in these shallow gravelly parts under the leaves of the plants suitable places to deposit their spawn, and without this they are seldom found to breed. Ponds made in this way may be of any convenient size, from a couple of yards upwards to as many acres. The following is the section of a pond

Fig. 137.



thus formed: *a* indicates the surface of the ground at the edge of the water; *b*, the puddle; *c*, the facing to preserve the puddle from injury; *d*, the water; *e*, the surface of the latter; and *f*, the ordinary bottom. When a small pond of this kind is to be made, and the extent of the surface is determined upon

and marked out, it will then be necessary to form a second or outer mark, indicating the space required for the wall or side puddle, and about three feet is the proper space to allow for this—the puddle requiring about two feet, and the facing which requires to be laid upon the puddle ought to be about a foot more, making together three feet. Ponds may be made very ornamental, and for suitable suggestions on this point, see *Water*.

PONGAMIA. Four species. Stove evergreen shrubs. Cuttings. Sandy loam and peat.

PONTEDEIRA. Seven species. Stove aquatics, except the hardy *P. cærulea*. Division. Rich light loam in water.

PONTHIEVA. Two species. Stove orchids. Division. Sandy loam and peat.

PONTIA. A genus of butterflies of which the following one is most obnoxious to the gardener:—

P. brassica, the large white cabbage butterfly is thus described by Mr. Kollar:—"The wings are white; the upper wings with broad black tips, and the female has two black spots on the middle. The under side of the under wings is light yellow. Breadth, when expanded, two inches. It appears from May to October. The caterpillar is bluish-green, thinly haired, and sprinkled with black dots, having a yellow stripe on the back, and the same on the sides. These caterpillars are found, throughout the summer and autumn, on all the sorts of cabbage, on horse-radish, radishes, mustard, and similar plants, as well as on water-cresses. The pupæ are yellowish-green, with black dots, with a point on the head, and five on the back. The best way to destroy them is picking off and killing the caterpillars, as well as the pupæ, as far as it is possible; the latter are found attached to adjacent trees, hedges, and walls. But care must be taken not to destroy those pupæ which have a brown appearance; because they are full of the larvæ of ichneumons, and other allied parasites, which are the great scourge of these caterpillars."—*Kollar*.

P. rapæ. Small White Cabbage Butterfly. The following extracts are from the same good authority:—"This Butterfly resembles the foregoing, but is

one half smaller; and the black tinge at the points of the upper wings is fainter, and not visible on the outer edge. The time of appearance is the same as of the former.

"The caterpillar is of a dull green, with fine white minute hairs, a yellow stripe on the back, and yellow spots on the sides, on a pale ground. In some years it is very injurious to the cabbage and turnip plants; it also infests the mignonette, which it strips entirely of its leaves. It is very difficult to be discovered from its colour. The pupa is yellowish or greenish-gray, with three yellow stripes. Like the former kind, it is found attached to trees, hedges," &c.—*Kollar*.

POPLAR. *Populus*.

POPPY. *Papaver*.

POPULUS. Poplar. Fifteen species, and many varieties. Hardy deciduous trees. Cuttings and layers. Light loam, near flowing water.

PORANA *volubilis*. Stove evergreen twiner. Seed. Loam and peat.

PORANTHERA *ericifolia*. Green-house evergreen shrub. Young cuttings. Sandy loam and peat.

PORLIERA *hygrometrica*. Stove evergreen shrub. Ripe cuttings. Loam and peat.

PORTHESIA. See *Bombyx*.

PORTLANDIA. Two species. Stove evergreen shrubs. Cuttings. Sandy loam and peat.

PORTUGAL LAUREL. *Cerasus luttanica*. This is a beautiful evergreen shrub, not sufficiently hardy to withstand the winters of the middle states—farther south it would be highly useful as a decoration to the garden and lawn during winter.

PORTULACA. Purslane. Fifteen species. Stove, green-house, and hardy annuals. Seed. Light loam. *P. grandiflora* is a tuberous perennial, increased by offsets. See *Purslane*.

PORTULACARIA *afra*. African Purslane Tree. Green-house evergreen shrub. Young cuttings. Sandy loam, well drained.

POSOQUERIA. Two species. Stove evergreen shrubs. Cuttings. Loam and peat.

POTATO. *Solanum tuberosum*

Varieties, for forcing or first crop, in the open ground:—Walnut-leaved Kidney, earliest; Broughton Dwarf; Early Warwick; Ash-leaved Kidney, white,

best; Soden's Early Oxford; Fox's Seedling, perhaps the best; Early Manly; Early Mule.

Earliest for general cultivation:—

Early Kidney; Nonsuch; Early Shaw; Gold Finder; Taylor's Forty-fold.

For main crops, the varieties are ranged in this class, according to their forwardness in ripening:—

Early Champion; Leathercoat; Ox Noble; Red Nose Kidney, very good; Large Kidney; Irish Cup; Bread Fruit, the best; Red Streak, or Lancashire Pink Eye; Black Skin; Purple; Red Apple; Rough Red.—All these are English varieties. At Philadelphia, where we write, but two sorts are extensively grown, viz., Mercer and Foxite; the former has had great popularity for both quality and product—the latter, though not productive, is the best we have ever seen grown in this country.

Soil and Situation.—No inhabitant of the garden varies more in quality in different gardens than the potato; for a variety will have a strong unpleasant flavour in one soil, that has a sweet agreeable one in another. In a heavy wet soil, or a rank black loam, though the crop is often fine and abundant, it is scarcely ever palatable. Silicious soils, even approaching to gravel, though in these last the tubers are usually corroded or scabby, are always to be planted in preference to the above. A dry, friable, fresh, and moderately rich soil, is unquestionably the best for every variety of the potato; and for the earliest crop, it may be with advantage more silicious than for the main ones.

The black-skinned and rough-red, thrive better than any other in moist strong cold soils.

If manure is necessary, whatever may be the one employed, it is better spread regularly over the surface previous to digging, than put into the holes with the sets, or spread in the trench when they are so planted.

Stable dung is perhaps the best of all factitious manures; sea-weed is a very beneficial addition to the soil; and so is salt.

Coal-ashes and sea-sand are applied with great benefit to retentive soils. The situation must always be open.

Time and Modes of Propagation.—It is propagated in general by the tubers, though the shoots arising from thence,

and layers of the stalks, may be employed. New varieties are raised from seed.

Planting in the open ground must be done with reference to the latitude in which we live—in Pennsylvania, for instance, those intended for the earliest crop may be planted in March; for a succession, in April; and for the main winter supply, in May. Formerly large crops were produced from plantations made in July, but latterly they have not succeeded.

Sets.—The next point for consideration is the preparation of the sets. Some gardeners recommend the largest potatoes to be planted whole; others, that they be sliced into pieces containing two or three eyes; a third set, to cut the large tubers directly in half; a fourth, the employment of the shoots only, which are thrown out if potatoes are kept in a warm damp situation; and a fifth, that merely the parings be employed. Cuttings of the stalks, five or six inches in length, or rooted suckers, will be productive, if planted during showery weather, in May or June; and during this last month, or early in July, it may be propagated by layers, which are formed by pegging down the young stalks when about twelve inches long, they being covered three inches thick with mould at a joint. These three last modes are practised more from curiosity than utility, whilst at the same time, none of the first five mentioned plans can be individually followed to advantage without modification. For the main crops, it is evident from experiment that moderate sized whole potatoes are the best, from which all but two eyes have been removed; but especially having the *crown*, which is a congery of small eyes, first removed; for from these proceed little spindled stalks, which are comparatively worthless, and injure the main stem.

For the early crops almost the very contrary to the above is the most advantageous to be practised. The set should have the crown-eye, which is one growing in the centre of the congery of small ones above mentioned, preserved. Some potatoes have two such eyes, but the generality only one. This is always the most prompt to vegetate, and if not known by this description, may be evinced by placing two or three potatoes in a pan of moist

earth near the fire. If the earth is kept moist, the crown-eye will be in a state of vegetation in five or six days.

To obtain early crops, where tubers are rapidly formed, large sets must be employed. In these one or two eyes at most should be allowed to remain. If the sets are placed with their leading buds upwards, few and very strong early stems will be produced; but, if the position is reversed, many weak and later shoots will arise, and not only the earliness but the quality of the produce be depreciated. For the earliest crops there are likewise several modes of assisting the forward vegetation of the sets. These should be prepared by removing every eye but one or two; and being placed in a layer in a warm room, where air and light can be freely admitted, with a covering of straw, they soon emit shoots, which must be strengthened by exposure to the air and light as much as possible, by taking off the cover without injuring them. During cold weather, and at night, it must always be removed: the leaves soon become green and tolerably hardy. In early spring they are planted out, the leaves being left just above the surface, and a covering of litter afforded every night until the danger of frost is passed.

The only modification of this plan that is adopted in Cheshire, where they are celebrated for the early production of potatoes, is, that they employ chaff or sand for a covering instead of straw.

Planting.—In garden culture the most preferable mode of inserting them is with the dibble, in rows; for the early crops twelve inches apart each way, and for the main ones eighteen inches. The sets should be placed six inches beneath the surface. The potato-dibble is the best instrument that can be employed; the earth being afterwards raked or struck in with the spade, and the soil not trampled upon but planted as sufficient is dug for receiving a row.

The compartment may be laid out level and undivided if the soil is light; but if heavy soil is necessarily employed, it is best disposed in beds six or eight feet wide. If the staple of the soil be good throughout, the alleys may be two feet wide and dug deep, otherwise they must be made broader, and only one spit taken out, the earth removed being employed to raise the

beds, which should not be more than four parallel ridges, and the sets inserted along their summits.

Hoeing.—As soon as the plants are well to be distinguished, they should be perfectly freed from weeds; and of the early crops the earth drawn round each plant, so as to form a cup as a shelter from the cold winds, which are their chief enemy at that season. But the main crops should not be earthed up, for earthing up diminishes the crop one fourth. Throughout their growth they should be kept perfectly clear of weeds.

It is very injurious to mow off the tops of the plants, as is sometimes recommended. The foliage ought to be kept as uninjured as possible, unless, as sometimes occurs on fresh ground, the plants are of gigantic luxuriance, and even then the stems should be only moderately shortened. It is, however, of considerable advantage to remove the fruit-stalks and immature flowers as soon as they appear, unless the stems are very luxuriant. A potato plant continues to form tubers until the flowers appear, after which it is employed in ripening those already formed.

The very earliest crops will be in production in July, or perhaps towards the end of June, and may thence be taken up as wanted until October, at the close of which month, or during November, they may be entirely dug up and stored. In storing, the best mode is to place them in layers, alternately with dry coal-ashes, in a shed. But a still better plan, usually, is to allow them to remain where grown, moulding the rows over six inches deep, and taking them up a week before wanted. The best instrument with which they can be dug up is a three-flat-pronged fork, each row being cleared regularly away.

The tubers should be sorted at the time of taking them up; for, as the largest keep the best, they alone should be stored, whilst the smaller ones are first made use of. The most common mode of preserving them, throughout the winter, is in heaps or clamps sometimes called *pyeing*. The heaps are laid in pyramidal form on a bed of straw, and enveloped with a covering, six or eight inches thick, of the same material, laid even as in thatching, and the whole inclosed with earth, in a conical form, a foot thick, taken from a trench

dug round the heap, and well smoothed with the back of the spade.

Potatoes should not be stored until perfectly dry, nor unless free from earth, refuse, and wounded tubers. It is a good practice to keep a hole open on four different sides of the heap, entirely through the earth and straw, for a week or two after the heap is formed; for in proportion to its size it always ferments, and these orifices allow the escape of the vapours and perfect the drying.

To raise Varieties.—A variety of the potato is generally considered to continue about fourteen years in perfection, after which period it gradually loses its good qualities, becoming of inferior flavour and unproductive; fresh varieties must, therefore, be occasionally raised from seed. The berries, or apples, of the old stock, having hung in a warm room throughout the winter, the seed must be obtained from them by washing away the pulp during February. This is thoroughly dried and kept until April, and then sown in drills about half an inch deep and six inches apart, in a rich light soil. The plants are weeded, and earth drawn up to their stems, when an inch in height: as soon as this has increased to three inches they are moved into a similar soil, in rows, sixteen inches apart each way, and during their future growth earthed up two or three times. Being finally taken up, in the course of October, they must be preserved until the following spring, to be then replanted and treated as for store crops.

Some gardeners sow in a moderate hot-bed, very thin, in drills the same depth as above, and nine inches apart. Water is frequently and plentifully poured between the rows, and earth drawn about the stems of the seedlings until they are a few inches in height. They are then transplanted into rows, water given, and earthing performed as usual. The only additional advantage of this plan is, that as the seed can be sown earlier, the tubers attain a rather larger size the first year.

It is to be remarked, that the tubers of every seedling should be kept separate, as scarcely two will be of a similar habit and quality, whilst many will be comparatively worthless, and but few of particular excellence. If the seed is obtained from a red potato that flow-

ered in the neighbourhood of a white-tubered variety, the seedlings, in all probability, will in part resemble both their parents; but seldom or never does a seedling resemble exactly the original stock. At all events, only such should be preserved as are recommended by their superior earliness, size, flavour, or fertility.

The early varieties—if planted on little heaps of earth, with a stake in the middle, and when the plants are about four inches high, being secured to the stakes with shreds and nails, and the earth washed away from the bases of the stems by means of a strong current of water, so that the fibrous roots only enter the soil—will blossom and perfect seed.

Forcing.—The season for forcing is from the close of December to the middle of February, in a hot-bed, and at the close of this last month on a warm border, with the temporary shelter of a frame. The hot-bed is only required to produce a moderate heat. The earth should be six inches deep, and the sets planted in rows six or eight apart, as the tubers are not required to be large. The temperature ought never to sink below 65°, nor rise above 80°.

The rank steam arising from fermenting dung is undoubtedly injurious to the roots of potatoes; and to obviate this they may be planted in narrow beds, and the dung applied in trenches on each side; or all the earth from an old cucumber or other hot-bed being removed, and an inch in depth of fresh being added, put on the sets, and cover them with four inches of mould. At the end of five days the sides of the old dung may be cut away in an inward slanting direction, about fifteen inches from the perpendicular, and strong linings of hot dung applied.

If the tubers are desired to be brought to maturity as speedily as possible, instead of being planted in the earth of the bed, each set should be placed in a pot about six inches in diameter; but the produce in pots is smaller. But young potatoes may be obtained in the winter, according to the following plan, without forcing:—

Plant some late kinds, unsprouted, in a dry rich border, in July, and again in August, in rows two feet apart. They will produce new potatoes in October,

and in succession until April, if covered with leaves or straw to exclude frost. If old potatoes are placed in dry earth, in a shed, during August, they will emit young tubers in December.

Preparation of Sets for forcing.—They should be of the early varieties. To assist their forward vegetation, plant a single potato in each of the pots intended for forcing, during January. Then place in the ground, and protect with litter from the frost. This renders them very excitable by heat; and, consequently, when plunged in a hot-bed, they vegetate rapidly and generate tubers. The seed potatoes are equally assisted, and with less trouble, if placed in a cellar just in contact with each other, and as soon as the germs are four inches long, are removed to the hot-bed.

Management.—More than one stem should never be allowed, otherwise the tubers are small, and not more numerous.

Water must be given whenever the soil appears dry, and in quantity proportionate to the temperature of the air. Linings must be applied as the temperature declines; and air admitted as freely as the temperature of the atmosphere will allow. Coverings must be afforded with the same regard to temperature.

From six to seven weeks usually elapse between the time of planting and the fitness of the tubers for use. The average produce from a light soil is about five pounds.

There is another mode of obtaining young potatoes, during the winter, which is much practised on account of its facility; though, being produced without foliage, they are not so fine in flavour, are deficient in farina, and are otherwise inferior. Old potatoes often throw out from their sides young ones, early in the spring; and of this habit advantage is taken in obtaining them still earlier. Some full-grown and ripe tubers, of the ox noble variety, that have no appearance of vegetating, must be laid alternately with layers of perfectly dry, rich, vegetable mould, four inches deep, in pans or boxes, until they are filled. These may be placed in a thoroughly dry shed, or on a shelf in the kitchen. If the layers are constructed in the corner of a shed or cellar, the produce will be equally good,

though longer in coming to perfection. No foliage is produced, the potatoes soon are surrounded by numerous young ones of moderate size. No water must ever be admitted on any account. Notice is to be taken that between three and four months elapse between the time of forming the layers and the fitness of the produce for use. Thus if made early in September, the crop will be ready in the course of December. When they are examined, those that are fit may be taken off, and the old potatoes replaced until the remainder are ready.

Potato Murrain.—By the above name was distinguished a moist gangrene which attacked very generally the potato crop of England late in the summer of the year 1845. July and August were unusually wet and cold, and early in August there were sharp morning frosts. Immediately after, the stems began to decay; but the weather continuing wet, instead of their decay being dry, and attended with the usual phenomena of their reduction to mere woody fibre, the putrefaction was moist, and the smell attendant upon it precisely that evolved during the decay of dead potato haulm partly under water. The stem decayed whilst the fibres connecting the tubers with them were fresh and juicy—the putrefaction spread along these, the ichor being absorbed by their still energetic vessels, and passing into the still immature and unusually juicy tubers, imparted to them the gangrene; the infection first being apparent at the end nearest the connecting fibre, spreading gradually throughout the liber of the tuber, rendering it brown like a decayed apple, and lastly causing the decay of its interior portion. Previously to the final decay, the increased specific gravity of the potato was remarkable, amounting to one-third more than that of a healthy tuber—an increase caused by its greater amount of water. When boiled it became black; but when submitted to a dry heat of about 200°, it rapidly lost moisture, and the progress of the ulceration was retarded, if not entirely stopped.

There can be no preventive for such a disease as this—and the only chance of saving the tubers is to mow off all the haulms close to the ground the moment infection is apparent in them. This might prevent the circulation of

the ichor to the tubers. These should be taken up forthwith and clamped as recommended by Dr. Lindley, with a layer of earth or sand alternating with each layer of potatoes.

The disease seems to be the natural result of an excessive degree of wet and cold at that period of closing growth when all bulbs and tubers require an increased degree of dryness and warmth. If the hyacinth, or tulip, or dahlia are submitted to similar unpropitious contingencies, their bulbs or tubers similarly decay.

It is not a new disease, for to a less extent it has been frequently noticed before. The best preservative of the tubers in such ungenial seasons is to take them up, to dry them perfectly, and then store them in a dry shed in dry coal ashes.

Much has been written on this subject, and the newspapers here and in Europe have been filled with speculations as to its duration, &c. The failure to a considerable extent of the crop of the present year, (1846), would indicate that the disease is not of such temporary character as had been hoped and predicted. If it continue all the old varieties must necessarily be abandoned, and reliance placed on new ones, raised from the seed proper; therefore, as a matter of precaution, we would recommend attention to that object. They are readily produced by carefully sowing the seed, and replanting the young tubers in successive seasons, until they attain full size. There is reason to hope such would be free from disease, or at any rate less liable to it, than the older varieties.

POTATO or UNDER-GROUND ONION. *Allium aggregatum.* This species of *Allium* has received the above appellations, on account of its producing a cluster of bulbs or offsets, in number from two to twelve, and even more, uniformly beneath the surface of the soil. From being first introduced to public notice in Scotland by Captain Burns of Edinburgh, it is there also known as the *Burn Onion*.

Varieties.—There evidently appear to be two varieties of this vegetable, one of which bears bulbs on the summit of its stems, like the tree onion, and the other never throwing up flower stems at all. One variety is much larger than

the other, and this vegetates again as soon as ripe.

Both varieties are best propagated by offsets of the root of moderate size, for if those are employed which the one variety produces on the summit of its stems, they seldom do more than increase in size the first year, but are prolific the next; this also occurs if very small offsets of the root are employed.

Planting.—They may be planted during October or November, or as early in the spring as the season will allow, but not later than April. They are either to be inserted in drills, or by a blunt dibble, eight inches apart each way, not buried entirely, but the top of the offset just level with the surface. Mr. Maher, gardener at Arundle Castle, merely places the sets on the surface, covering them with leaf-mould, rotten dung, or other light compost. The beds they are grown in are better not more than four feet wide, for the convenience of cultivation.

Cultivation.—The only cultivation required is to keep them clear of weeds. The practice of earthing the mould over them when the stems have grown up is unnatural, and by so doing the bulbs are blanched and prevented ripening perfectly, on which so much depends their keeping. So far from following this plan, Mr. Wedgewood, of Betley, recommends the earth always to be cleared away down to the ring from whence the fibres spring, as soon as the leaves have attained their full size and begin to be brown at the top, so that a kind of basin is formed round the bulb. As soon as they vegetate, they intimate the number of offsets that will be produced, by showing a shoot for each.

They attain their full growth towards the end of July; for immediate use they may be taken up as they ripen, but for keeping, a little before they attain perfect maturity, which is demonstrated by the same symptoms as were mentioned in speaking of the onion.

POTENTILLA. One hundred and sixteen species. Hardy herbaceous, except the green-house *P. lineariloba*. Seed and division. Light loam.

POTERIUM. Burnet. Six species. Chiefly hardy herbaceous and shrubby. The latter are increased by young cuttings, and the others by seed. Light rich loam.

Poterium Sanguisorba. Small, or Upland Burnet. Used in cool tankards, soups, and salads.

Soil and Situation.—It delights in a dry, poor soil, abounding in calcareous matter; any light compartment that has an open exposure, therefore, may be allotted to it, the only beneficial addition that can be applied being bricklayers' rubbish or fragments of chalk. A small bed will be sufficient for the supply of a family.

Propagation is either by seed, or by slips and partings of the roots. The seed may be sown towards the close of February, if open weather, and thence until the close of May; but the best time is in autumn, as soon as it is ripe; for, if kept until the spring, it will often fail entirely, or lie in the ground until the same season of the following year, without vegetating. Insert in drills, six inches apart, thin, and not buried more than half an inch. The plants must be kept thoroughly clear of weeds throughout their growth. When two or three inches high, thin to six inches apart, and those removed place in rows at the same distance, in a poor, shady border, water being given occasionally until they have taken root, after which they will require no further attention until the autumn, when they must be removed to their final station, in rows a foot apart. When of established growth, the only attention requisite is to cut down their stems occasionally in summer, to promote the production of young shoots, and in autumn to have the decayed stems and shoots cleared away.

If propagated by partings of the roots, the best time for practising it is in September and October. They are planted at once where they are to remain, and only require occasional watering until established. The other parts of their cultivation are as for those raised from seed.

To obtain Seed some of the plants must be left ungathered from, and allowed to shoot up early in the summer; they flower in July, and ripen abundance of seed in the autumn.

POT-HERBS. See *Herbary*.

To Dry Pot-Herbs.—Though growing plants can bear an elevated temperature without injury, a very different effect is produced upon them by even a lower heat after they have been sepa-

rated from their roots. This has to be borne in mind in the drying of pot-herbs, which, though it is a process very simple and very important for the winter cuisine that it should be conducted correctly, is usually more neglected and more thoughtlessly practised than any other in the varied range of the gardener's duties. To demonstrate this, will only require to have pointed out how it ought to be managed. The flavour of almost every pot-herb arises from an essential oil which it secretes, and this being in the greatest abundance just previously to the opening of its flowers, that is the time which ought to be selected for gathering. Pot-herbs ought to be dried quickly, because if left exposed to winds, much of the essential oil evaporates, and mouldiness occurring and long continuing destroys it altogether; for nearly every plant has its peculiar mucus, (mould,) the food of which is the characteristic oily secretion of the plant on which it vegetates. A dry brisk heat is therefore desirable; and as the fruit store-room ought always to have a stove, and is untenanted when herbs require drying, no other place can be more efficiently employed for the purpose. The temperature should be 90°, for if it exceeds this, the essential oils are apt to burst the integuments of the containing vessels and to escape. Forty-eight hours, if the heat is kept up steadily, are sufficient to complete the process of drying.

The leaves, in which alone the essential oils of pot-herbs reside, should then be carefully clipped with scissors, not crushed, from the stalks, and stored in tightly corked wide-mouthed bottles. Each will thus preserve its peculiar aroma, not only through the winter, but for years, and be infinitely superior to any specimens producible in the forcing department, for these are unavoidably deficient in flavour.—*Princ. of Gardening.*

POTIROS. Thirty-three species. Stove orchids. Division. Peat and loam.

POT-MARIGOLD. *Calendula officinalis.*

POTTING. *Pots* are the first consideration, and these are considered under the title *Flower Pot.*

Materials required.—These must not be sifted, but the pebbles and rough vegetable fibres be allowed to remain.

Mr. Errington has in his potting-shed twenty bins containing as follows:—

1. Strong tenacious loam.
2. Half-rotten leaf-mould.
3. Heath soil.
4. Horse manure.
5. Cow manure.
6. Charcoal wood-ashes.
7. Fine bone manure.
8. Sharp sand.
9. Burnt turf of No. 1.
10. Sphagnum, well scalded.
11. Heath soil of No. 3, in one inch squares.
12. Loam of No. 1, in one inch squares.
13. One-inch mixed drainage.
14. Two-inch mixed drainage.
15. Mixed drainage, small.
16. One-inch bottom-crocks.
17. Two-inch bottom-crocks.
18. Three-inch bottom-crocks.
19. Charcoal, large lumps.
20. One-inch boiled bone for bottoms.

Bin 1. (*Strong Tenacious Loam.*)—This is obtained from very old rest land, on a clayey or marly sub-soil; the more rushes and old coarse grass it contains, the better it is for the potting-shed; this is piled up in a sharp ridge out of doors, so as to exclude rain; it should be used for general purposes, when from six to twelve months old; I house a smaller portion in the compost shed after being dried in the sun; and this, I use for very particular purposes, such in fact as require, according to my estimation, lumps of turf in its native state, and for these purposes it is chopped into squares for bin 12. This loam is chopped down from a perpendicular facing, (like cutting hay,) when wanted for bin 1, and being somewhat mellow, a considerable portion of the mere soil falls out loose in the act of chopping. This is rejected, and the masses of chopped turf alone fill bin 1.

Bin 2. (*Half-rotten Leaf-mould.*)—This is generally slightly mixed with rotten dung, as it is the worn out pit linings, which have generally a little dung blended with the leaves. By lying in the compost yard for a few months, the outside becomes mellowed down, and after shaking some of the finest out through a quarter of an inch riddle, it is passed through a sieve of at least one inch in the mesh, and what comes through this is put into bin 2.

Bin 3. (*Heath Soil.*)—Obtained from

Delamere Forest, in parts where the heather is cut for making besoms. The upper surface of this heath soil is composed of heath leaves and moss, in a raw or half-decomposed state, and too fresh for the purposes of potting; but beneath this, and in contact with the gray sand, lies a flake of vegetable matter full of the roots of heather, possessing little sand, and compressed by the weight of centuries. This, when divested of the dirty sand under it, and of the mossy and raw matter on the surface, is put in bin 3, after being half-dried.

Bin 4. (*Horse Manure, or Old Horse Droppings.*)—Obtain them before high fermentation takes place, and ridge them up in the compost yard, three feet in width, three feet in height, and instantly roof them over (to shut in the gases) with double turves, each overlapping the other: in this way a slight fermentation takes place, which, being arrested, is beneficial. Rain is at all times excluded from this in the compost yard by the roofing.

Bin 5. (*Cow Manure.*)—This is cow droppings placed in a ridge, and roofed, similarly to the horse-dung, but allowed to remain to a much greater age; in fact, when placed in Bin No. 5, it has the appearance of rich peat, being at least two years old.

Bin 6. (*Wood Ashes and Charcoal.*)—Brush-wood at bottom, covered with all sorts of garden refuse, viz. cabbage stalks, potato haulm, hedge clippings, and in fact weeds and rubbish of all kinds, which, when about half-burned, are closed up with soils of any kind, and kept smouldering for days; when the combustion is complete it is subjected to a riddle of an inch mesh, and what comes through is housed in a dry state in this bin, the rest belongs to bin 19.

Bin 8. (*Sharp Sand.*)—Coarse river sand; but every potting-shed should be furnished with two kinds, the one very coarse and the other very fine, both as sharp as they can be obtained; the London propagating sand is an invaluable article.

Bin 10. (*Sphagnum, well scalded.*)—This is chiefly for orchidaceous plants, and requires to be steeped in boiling water for some hours previously to being transferred to this bin, in order to destroy insects. It is also useful to

cover fresh sown seeds, where it is desirable to insure a permanent moisture without frequent watering; it also produces a darkness favourable to germination.

Bin 13. (*One-inch Drainage termed No. 1.*)—This is composed of about equal parts of boiled bone, charcoal, and pounded crocks, in lumps averaging an inch square, and intended to cover the rough crock placed over the hole of pots, from No. 32 to No. 16 of the London sizes inclusive.

Bin 19. (*Charcoal in large lumps.*)—This is used to mix with the potsherds for orchidaceous plants, and when large masses are wanted for very large shifts.

Bin 20. (*One-inch boiled Bone.*)—This is used after the manner of No. 19, when considered requisite. To the above may be added old tan, riddled particularly clean; to be intermixed with or placed over the drainage; for such it answers exceedingly well, notwithstanding the prejudice against it. It is very well adapted for annuals in pots, a single crock with a handful or two of old tan over it, provides a safe drainage for a season, and withal a rooting medium.—*Gard. Chron.*

Care required.—A principal object to be aimed at in potting is complete drainage, for nothing is more injurious to most plants than stagnant water about their roots. The drainage is best effected by filling one-fourth the depth of the pot with the larger fragments of bones and charcoal mixed in equal proportions; this and the pebbles, woody fibres, &c., which are now allowed to remain in the soil, will remove from it all superfluous water. Dryness in the centre of the ball of earth is another evil to be avoided. Though not usually suspected, it occurs more often than excess of wet, and deprives the roots of a large proportion of their pasturage. To prevent it, a small rod of iron should be thrust through the earth around the stem occasionally, to allow the water poured upon the surface a freer entrance. Mr. Moore, to effect the same, says—“Whenever a plant (most particularly a valuable specimen plant) is repotted, either in its infancy or in its maturity, I would introduce a few sticks of charcoal perpendicularly into the pot; these should be long enough to extend from the bottom of the pot to the top of the soil; about three might

be placed at regular intervals, and they should be as close to the roots, and as near to the centre of the pots as possible. Thus if a plant is shifted but once, it will be provided with some channels for moisture, extending throughout the soil, and if it be frequently repotted, the number of these channels may be increased. When these are once introduced into the soil they are permanent; for being of material which is not subject to rapid decay, they will serve at least the lifetime of a plant, and by occasionally making use of a simple siphon, a mere worsted thread, in contact with moisture, a slow, moderate, and constant supply of moisture may be conveyed at pleasure to and through the centre of the soil, and the whole mass may thus be kept regularly and equably moistened."—*Gard. Chron.* See *One-Shift System*.

POUPARTIA. Three species. Stove evergreen trees. Ripe cuttings. Loam and peat.

POURRETIA. Five species. Stove herbaceous. *P. magnispatha* is an orchid. Seed and suckers. Sandy loam and peat.

PRATIA. Three species. Green-house herbaceous. Seed and division. Sandy loam and peat.

PREMNA. Four species. Stove evergreen shrubs. Seed and cuttings. Loam and peat.

PRESLIA *cervina*. Hardy herbaceous. Division. Moist soil.

PRESTONIA. Two species. Stove evergreen twiners. Cuttings. Sandy loam and peat.

PRICKLY CEDAR. *Cyathodes orycedrus*.

PRIESTLEYA. Fourteen species. Green-house evergreen shrubs. Young cuttings. Sandy loam and peat.

PRIMROSE. *Primula vulgaris*.

PRIMULA. Forty-nine species and many varieties. Herbaceous and all hardy except the fringed green-house varieties, *P. præniten*s, and the species *P. verticillata*. Division and seed. Loam and leaf-mould.

P. auricula. See *Auricula*.

P. elatior. Oxlip.

*P. præniten*s or *sinensis*. Chinese Primrose. This is hardy if grown in a light, well-drained soil, but its white and pink fringed varieties require wintering in the green-house.

P. veris. Cowslip.

P. vulgaris. Primrose. Of this there are the following cultivated varieties: Brimstone; Crimson; Hose-in-hose; Lilac; Purple; Scotch; Stemless White; White and Yellow. All the species may be cultivated like the *Polyanthus*.

PRINCE, WILLIAM. The name of Prince is identified with American horticulture. Perhaps no man has done more to gratify the taste of amateurs of flowers and fruit than the late William Prince, whose extensive grounds at Flushing, New York, were the nursery of almost every vegetable calculated to please the eye or palate. We regret that there is not within our reach the data from which to draft a particular description of the foundation, rise and progress of the "Linnæan Botanic Garden."

PRINCE'S FEATHER. *Amaranthus hypochondriacus*.

PRINOS. Eleven species. Hardy deciduous shrubs, except the stove evergreen *P. montanus* and *P. lucidus*, which is evergreen and hardy. Cuttings and layers. Light loam and peat.

PRISMATOCARPUS. Four species. *P. diffusus* is a green-house evergreen shrub; *P. fruticosus* is a hardy evergreen shrub; the others green-house herbaceous. Young cuttings and seed. Sandy loam and peat.

PRIVET. *Ligustrum*.

PROCKIA. Three species. Stove evergreen shrubs. Cuttings. Sandy loam and peat.

PROLIFEROUS. See *Double-Flower*.

PROPS are the supports required by plants to sustain them in a desired position. They must vary in height and strength accordantly with the plant to which they are applied, and should always be as slight as is consistent with efficiency. Nothing looks worse than a disproportioned prop; indeed it should be concealed as much as possible. The props for peas should be of the branches of the hazel; for runner kidney beans, rods of ash. For flowers, stout iron wire painted dark green are to be preferred. Some flowers require props of a peculiar form; but these will be described when giving directions for their culture. Whenever wooden props are

used, the end thrust into the ground should be previously charred; if this precaution be taken, and when no longer required, they are stored in a dry shed, they will last for several seasons. Props should be placed on the south sides of the plants, as they incline in that direction, as being most light.

PROSERPINACA. Two species. Half-hardy annual aquatics. Seed. Rich loam in water.

PROSOPIS. Five species. Stove evergreen trees. Cuttings. Peat and loam.

PROSTANTHERA. Seven species. Green-house evergreen shrubs. Young cuttings. Sandy peat.

PROTEA. Forty-seven species. Green-house evergreen shrubs. Ripe cuttings taken off at a joint; sandy turfy loam, well drained. Water moderately, but regularly.

PRUNELLA. Self-Heal. Fourteen species. *P. Browniana* and *P. ovata* are hardy annuals, the others hardy herbaceous. Seed or division. Light rich loam.

PRUNING, as practised in the garden, has for its object the regulation of the branches to secure the due production of blossom and maturity of fruit. If carried to too great an extent, that object is not attained, for every tree requires a certain amount of leaf-surface for the elaboration of its sap; and, therefore, if this be reduced too much, blossom buds are produced less abundantly, for leaves are more necessary for the health of the plant, and by a wise provision the parts less requisite for individual vigour are superseded by the parts more needed. On the other hand, if the branches are left too thick, they overshadow those beneath them, and so exclude the light, as to prevent that elaboration of the sap, without which no blossom buds are formed, but an excessive production of leaves, in the vain effort to attain by an enlarged surface that elaboration which a smaller surface would effect in a more intense light. The appropriate pruning is given when considering each species of fruit trees, and here we must confine ourselves to a few general remarks: "The season for pruning must be regulated in some degree by the strength of the tree; for although, as a general rule,

the operation should not take place until the fall of the leaf indicates that vegetation has ceased, yet if the tree be weak, it may be often performed with advantage a little earlier; but still so late in the autumn as to prevent the protrusion of fresh shoots. This reduction of the branches before the tree has finished vegetating, directs a greater supply of sap to those remaining, and stores up in them the supply for increased growth next season. If the production of spurs is the object of pruning a branch, it should be pruned so as to leave a stump; because as the sap supplied to the branch will be concentrated upon those buds remaining at its extremity, these will be productive of shoots, though otherwise they would have remained dormant, it being the general habit of plants first to develop and mature parts that are farthest from the roots. It is thus the filbert is induced to put forth an abundance of young bearing wood, for its fruit is borne on the annual shoots, and similar treatment to a less severe extent is practised upon wall fruit."—*Princ. of Gardening.*

The mystery of pruning consists in being well acquainted with the mode of the bearing of the different sorts of trees, and forming an early judgment of the future events of shoots and branches, and many other circumstances, for which some principal rules may be given; but there are particular instances which cannot be judged of but upon the spot, and depend chiefly upon practice and observation.—Peaches, nectarines, apricots, &c., all produce their fruit principally upon the young wood of a year old; that is, the shoots produced this year bear the year following; so that in all these trees, a general supply of the best shoots of each year must be everywhere preserved at regular distances, from the very bottom to the extremity of the tree on every side; but in winter pruning, or general shortening, less or more, according to the strength of the different shoots, is necessary, in order to promote their throwing out, more effectually, a supply of young wood the ensuing summer, in proper place for training in for the succeeding year's bearing.

Vines also produce their fruit always upon the young wood shoots of the

same year, arising from the eyes of the last year's wood only; and must, therefore, have a general supply of the best regular shoots of each year trained in, which, in winter pruning, must be shortened to a few eyes, in order to force out shoots from their lower parts, only properly situated to lay in for bearing the following year.

Figs bear also only upon the young wood of a year old, and a general supply of it is, therefore, necessary every year; but these shoots must at no time be shortened, unless the ends are dead, because they always bear principally towards the extreme part of the shoots, which, if shortened, would take the bearing or fruitful parts away; besides, they naturally throw out a sufficient supply of shoots every year for future bearing, without the precaution of shortening.

Apple, pear, plum, and cherry trees bear principally on spurs, arising in the wood of from two or three, to ten or twenty years old, the same branches and spurs continuing bearing a great number of years; so that, having once procured a proper set of branches in the manner already directed to form a spreading head, no farther supply of wood is wanted than some occasional shoots now and then to supply the place of any worn out or dead branch. The above-mentioned spurs or fruit-buds are short robust roots of from about half an inch to one or two inches long, arising naturally, first towards the extreme parts of the branches of two or three years old, and, as the branch increases in length, the number of fruit-buds increases accordingly.

In pruning always cut quite close, both in the summer and winter pruning, which, in the summer pruning, if attended to early, while the shoots are quite young and tender, they may readily be rubbed off quite close with the thumb; but when the shoots become older and woody, as they will not readily break, it must be done with a knife, cutting them as close as possible; and all winter pruning must always be performed with a knife. In pruning in summer, the necessary supply of regular shoots left for training in should never be shortened during this season, unless to particular shoots, to fill a vacancy; for, by a general shortening in this season, all the shoots so treated

would soon push again vigorously from every eye, and render the trees a thicket of useless wood. Therefore, all sorts, whether they require shortening in the winter pruning or not, should, in the summer dressing, be layed in at full length; but towards the end of August, the extreme points may be pinched off with great advantage. The sap is thus made to complete the growth of the shoot, and not to increase its length; and it is too late in the season for fresh shoots to be induced.

Summer pruning is a most necessary operation. Young shoots require thinning to preserve the beauty of the trees, and encourage the fruit; and the sooner it is performed the better. It is, therefore, advisable to begin this work in May, or early in June, removing all superfluous growths and ill placed shoots, which may be performed with considerably more expedition and exactness than when after the trees have shot a considerable length. Where, however, a tree is inclined to luxuriance, it is proper to retain as many of the regular shoots as can be commodiously trained in with any regularity, in order to divide and exhaust the too abundant sap. It will be necessary to review the trees occasionally, in order to reform such branches or shoots as may have started from their places, or taken a wrong direction; also that, accordingly as any fresh irregular shoots produced since the general dressing may be displaced; and, likewise, as the already trained shoots advanced in length, or project from the wall or espalier, they should be trained in close.

In the winter pruning, a general regulation must be observed, both of the mother branches, and the supply of young wood laid in the preceding summer; and the proper time for this work is any time in open weather, from the fall of the leaf in November, until March; but the sooner the better. In performing this work, it is proper to unnaill or loosen a chief part of the branches, particularly of peaches, nectarines, apricots, vines, and other trees requiring an annual supply of young wood. First look over all the principal or mother branches, and examine if any are worn out, or not furnished with parts proper for bearing fruit, and let such branches be cut down to the great

branch from which they proceed, or to any lower shoot or bottom part, leaving these to supply its place. Likewise examine if any branches are become too long for the allotted space, either at sides or top, and let them be reformed accordingly, by shortening them down to some lower shoot or branch properly situated to supply the place, being careful that every branch terminates in a young shoot for a leader, and not stumped off at the extremity. From the principal or larger branches pass to the shoots of the year which were trained up in summer, first cutting out close all foreright and other irregular shoots that may have been omitted in the summer pruning; likewise all very weak shoots, and those of very luxuriant growth, unless it be necessary to keep some to supply a vacant place. In this pruning, as in the summer dressing, it is of importance to have a strict eye to the lower parts of wall-trees, &c., to see if there is any present vacancy, or any that apparently will soon happen, in which cases, if any good shoot is situated contiguous, it should be trained in, either at full length, or shorten it to a few eyes, to force out two or more shoots, if they shall seem necessary; for precaution should ever be observed in taking care to have betimes a sufficient stock of young wood coming forward to fill up any casual vacancy, and substitute a new set of branches in place of such as are either decayed or stand in need of retrenchment.

Sometimes in wall-trees and espaliers there are many large disagreeable barren spurs, consisting both of old worn out fruit spurs, and of clusters of stumps of shortened shoots projecting considerably from the branches, occasioned by unskilful pruning, when retrenching the superabundant and irregular shoots which, instead of being cut out close, are stumped off to an inch or two long. At this season of pruning, it is advisable to reform them as well as possible, by cutting all the most disagreeable stumps close to the branches, leaving these at full length, especially if apples, pears, &c., and reserve an occasional supply of young wood in different parts, and thus, in two or three years, you may reduce such trees to a regular figure, and a proper state of bearing.

Too severe pruning is greatly prejudicial to the health of some sorts of

fruit. Plums and cherries, in particular, are often greatly damaged by a too severe discipline of the knife, these trees being very liable to gum by large amputations. It is, therefore, of importance to attend to these trees well in the summer pruning, to retrench all the superfluous and irregular shoots while quite young, and pinch others occasionally where wood is wanted to fill vacancies, so as to require but little pruning out of large wood in winter.—*Abercrombie*.

PRUNING APPARATUS. In all mechanical operations success is more certainly attained by the use of proper implements; though pruning or the lopping of branches may be very simple, yet there is great advantage in executing it with the instruments best adapted to the purpose, most of which are described in these pages, under their proper heads.

PRUNUS. Plum. Eight species and many varieties. *P. domestica*, see *Plum*. All hardy deciduous trees. Seed, suckers, and grafting or budding. Common soil, well drained.

PSIDIUM. Guava. Thirteen species. Stove evergreen shrubs. Cuttings. Loam and peat.

PSOPHOCARPUS *tetragonobulus*. Annual stove twiner. Seed. Light rich loam.

PSORALEA. Forty-two species. The green-house and stove evergreens are increased by cuttings; the half-hardy herbaceous, by seed and cuttings; the biennials, by seed. All require light loam and peat.

PSYCHOTRIA. Sixteen species. *P. daphnoides* is a green-house evergreen shrub; *P. parasitica* is a parasite, and the others stove evergreen shrubs. Cuttings. Sandy loam and peat.

PSYLLA. The chermes, nearly allied to the aphid. *P. pyri*, Pear chermes, appears in May, not unlike a large aphid, crimson coloured, shaded with black. Mr. Kollar thus details its habits:—

“As soon as the fruit trees put out buds, the winged chermes makes its appearance. When pairing is over, the female lays her eggs in great numbers near each other on the young leaves and blossoms, or on the newly formed fruit and shoots. They are of a longish shape, and yellow; and, without a magnifying glass, they resemble the pollen

of flowers. They are called either nymphs or larvæ in this state (according to the extent of their development); and, like their parents, have their mouth in the breast. After a few days, they change their skins, and become darker, and somewhat reddish on the breast, and rather resemble bugs than plant-lice, having the extreme point of the body somewhat broad, and beset with bristles. After changing their skins, they leave the leaves, blossoms, and fruit, and proceed more downwards to the bearing wood and the shoots of last year, on which they fix themselves securely, one after the other, in rows, and remain there till their last transformation.

"When the nymphs have moulted for the last time, and have attained their full size, the body swells out by degrees, and becomes cylindrical. They then leave their associates, and before they lay aside their nymph-like covering, they search out a leaf to which they fasten themselves firmly, and appear as if they were lifeless. After a few minutes the skin splits on the upper part of the covering, and a winged insect proceeds from it. It is of a pleasant green colour, with red eyes, and snow-white wings. It very much resembles its parents in spring, even in the colour. After a few days, this chermes has assumed the colours of the perfect insect; the head, collar, and thorax, are of an orange colour, and only the abdomen retains its green hue. It now flies away from the place of its birth, to enjoy the open air."

P. mali. Apple Chermes. For the following I am also indebted to the too much neglected work of M. Kollar:—

"It usually appears in June. In September, the apple chermes pair, and lay their eggs. They are white, and pointed at both ends, a line and a half long, and the fourth of a line thick, and become yellow before the young escapes. The apple chermes lays its eggs in different places of the twigs of an apple-tree; usually, however, in the furrows of the knots, and sometimes in a very regular manner. The larvæ were scarcely escaped from the egg, in the open air, when they hastened to the nearest bud, and began to gnaw its scales, because the bud was only somewhat swollen, and had not begun to sprout. On the second day after their

birth, they cast their first skin, after which they appeared nearly of their former shape and colour. The second changing of the skin can sometimes be scarcely seen at all, because the larva not only puts out a thicker string with the tubercle, but also an immense number of very fine entangled threads or small hairs, which it turns upwards over its back, and with them entirely covers its body and head. In sunshine, these strings look transparent, as if they were made of glass, and become of a greenish variable colour. Under this screen the chermes are secured from every attack of other insects; for no ants, mites, or bugs can disturb them in their fortification, or consume them as their prey. After changing the second skin, the young assumed a different colour and form; they now became light green all over, the abdomen was much broader than the thorax, and on the side of the latter, rudiments of the wings were distinctly seen. The third time of changing the skin comes on in about eight days, sometimes sooner and sometimes later, according to the weather. After this skin the wing rudiments very distinctly make their appearance, and become larger and whiter the nearer the insect approaches to the perfect state. The body is also of a light green, and the larvæ have black eyes, and blackish antennæ. At last the time arrives when the insect assumes the perfect state; when it retires to a part of a leaf which it had selected, and after having firmly fixed itself there, the back splits open, and the beautiful winged chermes appears from the nymph. The back of the thorax is of a light green, the abdomen is marked with yellow rings, and the membranous wings with strongly marked snow-white veins."

P. crategi infests the camellia. It is destroyed by syringing with tobacco water, or diluted gas ammoniacal liquor, until the insects are dead, and then syringing with water only.

P. ficus and *P. rosæ*, are respectively on the fig and rose trees.

PTELEA trifoliata. Hardy deciduous shrub. Layers. Light rich loam.

PTHELIDIDUM ovatum. Stove evergreen shrub. Ripe cuttings. Sandy loam and peat.

PTERIS. Forty-six species. Stove, green-house, and hardy and herbaceous

ferns. Division and seed. Sandy loam and peat.

PTEROCARPUS. Eight species. *P. scandens* is a stove climber, and the others stove evergreen trees. Young cuttings. Rich light loam.

PTEROCEPHALUS. Four species. *P. dumetorum* is a green-house evergreen shrub, the others are hardy annuals; the first is increased by cuttings, and all by seed. Light loam.

PTERODISCUS speciosus. Stove tuber. Division. Rich sandy loam. Probably half-hardy.

PTERONEURON. Two species. One herbaceous, the other annual; both hardy. Seed. Light loam.

PTERONIA. Nine species. Green-house evergreen shrubs. Cuttings. Loam and peat.

PTEROSPERMUM. Six species. Stove evergreen trees. Cuttings. Sandy loam and peat.

PTEROSTYLIS. Twelve species. Green-house orchids. Division. Sandy loam and peat.

PTILOSTEPHIUM. Two species. Hardy annuals. Seed, in a hot-bed; and seedlings planted in light open border.

PUCCOON. *Sanguinaria.*

PUDDLING. See *Mudding.*

PUERARIA. Two species. Green-house evergreen climbers. Cuttings. Sandy loam and peat.

PULMONARIA. Eight species. Hardy herbaceous. Division. Light loam.

PULTENÆA. Fifty species. Green-house evergreen shrubs. Half-ripe cuttings. Sandy loam and peat.

PUMPKIN. *Cucurbita pepo.* See *Gourd.*

PUNICA. Pomegranate. Two species, and several varieties. Half-hardy deciduous shrubs. All are increased by cuttings and layers, and the less common by grafting on the more common. Light rich loam. The fruit of the common pomegranate, *P. granatum*, ripens well against a south wall.

PUNNET. See *Basket.*

PURSBIA tridentata. Hardy evergreen shrub. Cuttings. Light well drained loam.

PURSH, FREDERICK, was a native of Germany, and is distinguished as an early classifier of our native vegetables. He immigrated to the United States somewhere about 1800, and was for a

short period, we believe, in charge of the Hamilton collection, at the Woodlands, near Philadelphia. His "*Flora Septentrionalis*, or a systematic arrangement and description of the plants of North America," is a standard work, and evinces his thorough acquaintance with the subject. But little is known of Pursh's personal history.

PURSLANE. *Portulaca.*

P. oleracea. Green, or Garden Purslane.

P. sativa. Golden Purslane.

Soil and Situation.—A light rich soil is the one in which they thrive most, and they must have a warm situation, as a south border. Sow in February and early in March, in a moderate hot-bed, to remain where sown; and at the close of March, and once monthly, during April, May, and the summer months until the end of August, in the open ground.

Sow in drills six inches apart, very thin, and about half an inch deep. The plants soon make their appearance. They must be kept clear of weeds, and thinned to six or eight inches asunder. In dry weather water is required moderately two or three times a week.

In general, they are ready for gathering from in six weeks after sowing, the young shoots being made use of from two to five inches in length, and the plants branch out again.

The hot-bed crops require the air to be admitted as freely as possible, the temperature ranging between 50° and 75°.

To obtain Seed.—As a small quantity will suffice for the largest family, a few of the earliest border-raised plants must be left ungathered from; the strongest and largest leaved being selected; they blossom in June and July. They must be cut immediately the seed is ripe, laid on a cloth, and when perfectly dry, thrashed. The refuse is best separated by means of a very fine sieve.

PURSLANE-TREE. *Portulacaria.*

PUSCHKINIA scilloides. Half-hardy bulb. Offsets. Sandy loam.

PUTTY is a compound of boiled linseed oil and whiting, but as it may be bought in London at half-a-guinea per cwt., it is scarcely worth the gardener's while to make it. One hundred weight is enough for puttying about three hundred square feet of glass.

Old putty may be softened by apply-

ing to it rags dipped in a saturated solution of caustic potash, leaving them on for twelve hours; or by rubbing a hot iron along the putty.

If the gardener does make putty, the whitening should be well dried, and then pounded and sifted till it becomes a fine powder, and is quite free from grit. The whitening, a little warm, should be gradually added to the oil, and well mixed by means of a piece of stick, or a spatula. When it is sufficiently stiff, it should be well worked with the hand on a table, and afterwards beaten on a stone with a wooden mallet, till it becomes a soft, smooth, tenacious mass. A ball of putty, when left some days, becomes somewhat hard, but may be easily softened by beating.

PYCNANTHEMUM. Seven species. Hardy herbaceous. Division. Peat, with a little light loam.

PYCNOSTACHIS carulea. Stove annual. Seed. Light rich loam.

PYRALIS forficalis. Cabbage-garden Pebble Moth. Its appearance and habits are thus detailed by M. Kollar:—"The head, back, and upper wings of the moth are hazel-brown, and brownish gold; the antennæ light brown; the abdomen and under wings whitish. On the upper wings are two distinct, and two faint deep rusty-brown stripes. The first brood flies in May, and the second in August. The caterpillar is found in May and June, and the second generation in September and October. It has a light-brown head, and a yellowish-green body, with blackish stripes running lengthwise, and blackish dots having fine white lines between, and white incisions and spiracles. Its length is about eight lines. When these caterpillars are numerous, they do important damage to the cabbage tribe, and horse-radish.

PYRASTER. *Pyrus communis pyra-ster.*

PYRETHRUM. Fifty species. Hardy herbaceous, and green-house evergreen shrubs, except a few hardy annuals, and *P. simplicifolium*, which is a stove evergreen trailer. The shrubs are increased by cuttings, the herbaceous by division, and the annuals by seed. A light rich loam suits the whole.

PYROLA. Eight species. Hardy herbaceous. Division and seed. Shady border of peat, with a little light loam.

PYROLIRION aureum. Green-house bulb. Offsets. Sandy loam.

PYRULARIA pubera. Half-hardy deciduous shrub. Cuttings. Light loam.

PYRUS. Forty-four species, and very numerous varieties. Seed, cuttings, and grafting. Light loam, well drained. See *Apple*, *Pear*, and *Service*.

PYXIDANTHERA barbulata. Half-hardy trailer. Cuttings and division. Peat, and a little sandy loam.

QUAMOCLIT. Ten species. Herbaceous, and annual. *Q. sanguinea* is evergreen. Young cuttings or seed. Light rich loam.

QUENOUILLE is a fruit tree, with a central stem, and its branches trained in horizontal tiers, the lowest being the longest, and the others of course gradually lessening in length as they do in age, so that the tree, like a spruce fir, acquires a pyramidal form.

QUERCUS. The Oak. Forty-eight species, and many varieties. Hardy evergreen and deciduous trees. Seed, and grafting for some of the merely ornamental kinds. Deep clayey loam in valleys. *Q. cerris*, Bitter Oak. *Q. robur* or *sessiliflorum*, Common Oak. *Q. ilex*, Evergreen Oak.

QUICKSET, the same as the Hawthorn, or Whitethorn, *Cratægus oxyacantha*. See *Hedge*.

QUINCE. *Cydonia vulgaris*.

Varieties:—Common; Apple-shaped; Pear-shaped; and Portugal. The last is the best, and very distinct from the others. *C. sinensis*, the Chinese Quince, has been fruited in this country, but it requires a wall. The fruit is very different from that of either the common or Portugal quinces; it is cylindrical, about six inches in length, and exceedingly gritty.

Method of Propagation and general Culture.—The trees may be raised from seed sown in autumn, but there is no certainty of having the same or any good fruit from seedlings. But the several varieties may be propagated by cuttings and layers; also by suckers from such trees as grow upon their own roots, and by grafting and budding upon their own or pear-stocks.

The propagation by cuttings, layers, and suckers, may be performed in autumn, winter, or early spring.

Choose young wood for the cuttings and layers. They will be rooted by

next autumn; then transplant into nursery rows two feet asunder; plant the suckers also at the same distance, and train the whole for the purposes intended; if for standards with a stem, to any desired height, from three to six feet; then encourage them to branch out at top, to form a head; and those designed as dwarfs must be headed near the ground, and trained accordingly, for espaliers or dwarf standards.

When they have formed tolerable heads, plant them out finally. Standard quinces, designed as fruit trees, may be stationed in the garden or orchard and some by the sides of any water in by places, suffering the whole to take their own natural growth. And as espaliers they may be arranged with other moderate growing trees, about fifteen feet apart.—*Abercrombie*.

QUINCUNX is the form resulting from planting in rows, with one plant opposite the centre of each vacancy in the row on each side of it, as in this diagram.—

Fig. 138.



QUISQUALIS. Four species. Stove evergreen climbers. Young cuttings. Sandy loam and peat.

QUIVISIA *heterophylla*. Stove evergreen shrub. Ripe cuttings. Peat and light loam.

RADISH.—“The Radish is originally from the East Indies, but cultivated in Europe since the sixteenth century. Formerly the leaves were often boiled and stewed; but now the roots are chiefly employed. The young seedling leaves are often used with cress and mustard, as small salad, and radish seed pods, when of plump growth, but still young and green, are used to increase the variety of vegetable pickles, and are considered a tolerable substitute for capers.

“The well known manner in which this vegetable is cultivated, renders any observations thereon unnecessary. All that is required, is to point out the

varieties which answer best at different seasons of the year. For the early crops, use the Long Scarlet Short Top; the Long Salmon, similar to the above, but of lighter colour, and white at the point; the Scarlet Turnip Rooted, and White Turnip Rooted; frequent sowings are necessary, as all the foregoing soon become pithy and shoot to seed. In flavour they differ but little; discrimination is from fancy. At the same time the early kinds are sown, make a sowing of the Yellow Turnip, and Summer White, which are fine kinds, withstand the heat, and are firm and crisp even in hot weather; frequent sowings of these, as well as the White Spanish or Black Spanish, as most liked, should be made during the summer months. The two latter kinds sown in the autumn, keep well throughout the winter, if secured from frost. In the autumn, any of the early kinds may be again sown; when about to do so, always observe to dig the earth deeply, and pulverize it well, which tends to produce fine shaped roots.”—*Rural Reg.*

To obtain Seed.—Leave in April or early May, some of the most perfect plants of a main crop. When in full vigour they must be taken up with as little injury as possible to the roots and leaves, and planted in rows three feet asunder each way, being inserted by the dibble, completely down to the leaves. Water must be applied until they have taken root, and occasionally throughout their growth, especially when in flower. If practicable, it is best to leave some plants where raised.

To obtain seeds of the Black Spanish, some seeds must be sown in March, or some of the winter-standing crop left or transplanted during that month.

The flowers open from June until August, and their pods are of a size fit for pickling, as they must be gathered whilst young and tender, during that last month, or July. For seed, they must be cut as soon as they become of a brown hue, and well dried, otherwise it will thresh with difficulty.

Two varieties must never be raised near each other, and seed of the previous year's raising should always be employed.

Forcing.—A moderate hot-bed is required for this crop, of a length according with that of the frame to be

employed; the earth about eight inches deep, on the surface of which the seed is to be sown as soon as the violent heat is abated, and an additional half-inch sifted over it.

The seedlings are in general up in less than a week, and in six they will be ready to draw. Throughout their growth air must be admitted as freely as is allowable. The glasses, however, must be closed on the approach of evening, and mats or other covering put on in proportion to the severity of the season. When the earth appears at all dry, a light watering must be given during the noon.

The plants must not stand nearer than two inches to each other. The temperature required is from 50° to 70°; and it must be kept to this heat by moderate coatings as required.

If there be a deficiency of frames, hoops and mats may be employed, a

frame of boards being formed round the bed, light and air being admitted as freely and as often as possible. If seed is sown within a frame without any bottom heat, the plants will be two or three weeks forwarder than if sown in the open ground.

RAFANIA. Five species. Green-house evergreen shrubs. *R. triflora* is a biennial. Young cuttings. Peat and loam.

RAGGED ROBIN. *Lychnis Flos-cuculi*.

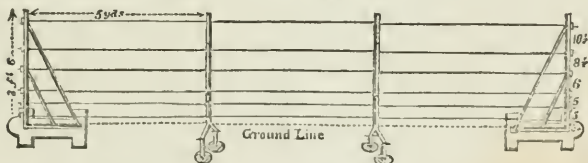
RAGS. See *Vegetable Manures*.

RAGWORT. *Othonara*.

RAGWORT. *Senecio Jacobaea*.

RAILING is of various forms, but all, if made of wood, are soon decayed if slight, and clumsy and inelegant if strong. Iron railing is at once light, neat, and enduring, and like the following, may be purchased in England for about fifty cents per yard.

Fig. 139.



RAKE (Fig. 140). “*Garden Rakes* vary in the length and strength of their teeth, as well as in their number; they are used for covering seeds, raking off weeds or cut grass, smoothing and pulverizing surface, &c. This implement is now much less in use than formerly, when broadcast sowing was prevalent. Now the broad hoe is quite as efficient in covering drill-sown seed.

Fig. 140.



to cut off the flower heads or buds of daisies, dandelions, and other plants, and the uneven tufts on grass lawns.”
—*Rural Reg.*

Fig. 141.



RAMONDIA pyrenaica. Hardy herbaceous perennial. Division. Light soil.

RAMPION. *Phyteuma* and *Cyphia Phyteuma*.

RAMPION. *Campanula rapunculus*.
Soil and Situation.—The soil ought to be moderately moist, but it must be light. A shady rich border is most favourable. If it is cloddy or subject

“The Grass Lawn Rake, (Fig. 141,) has teeth sharpened on both edges, and is used for raking the grass in order

to bind and crack in hot weather, the plants will not thrive.

Time and Mode of Sowing, during March, April, and May, the plants from sowing in the two first months, soon, however, run up to seed.

The insertions are to be performed in drills six inches apart.

The plants are to remain where sown; though in case of any deficiency, those which are taken away in thinning the crops, may be transplanted successfully, if removed to a border similar to the seed-bed, and inserted with the roots perpendicular, and without pressing the mould too close about them. The best time for performing the removal is of an evening.

They are fit for thinning when of six or eight weeks' growth, or when about two inches in height; they must be set at a distance of six inches apart, being hoed at the time, and the same operation repeated two or three times.

The plants of the sowings during the two first-mentioned months will be fit for use at the close of August, or early in September, and continue throughout the autumn. Those of the last one will continue good throughout the winter, and until the following April.

The soil throughout their growth must be kept moist by giving frequent but moderate waterings through the fine rose of a watering-pot, as required.

The root for which it is cultivated, either to be sliced together with its leaves in salads, or eaten as the radish, as well as to be boiled like asparagus, is most palatable when drawn young, and eaten fresh from the ground.

To obtain Seed.—A few of the winter-standing plants are left unmoved. These shoot up in the spring, flowering in July and August, and ripening abundance of seed in early autumn. Nothing more is necessary than to gather it before it begins to scatter, and to lay it on a cloth to become perfectly dry before thrashing.

RANDIA. Ten species. Stove evergreen shrubs. Partly ripe cuttings. Loam and peat, and a strong moist heat.

RANUNCULUS. One hundred and two species, and many varieties. *R. asiaticus*, the Garden Ranunculus, is a truly beautiful flower, unfortunately not adapted to the climate of the United States.

Varieties.—Mr. Jackson, the florist

of Kingston, has published the following selection:—

CLASS I.—SELFS.

Æil Noir, very fine, dark rich colour; Naxara extra, fine dark (one of the best of its class); Fete Nocturne, rich purple, fine; Duke of Bedford, large fine formed, crimson; Giles's Eliza, very fine, straw, extra form, super variety; Costar's Apollo, very fine dark, rather coarse; Plaisance, very fine, yellow, good form; Les Vos, dark purple, very fine; Rosa Montana, superior bright rosy crimson, excellent form; Tyso's Nivis, fine white; Costar's Tippoo Saib, rich dark; Condorcet, fine pure purple; Bouquet Nonpareil, dark olive, very fine.

CLASS II.

Flavimorus, cream, with purple edge, very fine; Tyso's Victoria, clear white, with crimson edge, very fine; Aust's Henrietta, white, crimson-edged, good shape, very fine; Horatio, yellow-edged, fine free bloomer, not quite a pure ground; Tyso's Herbert, yellow, with red edge, very fine; Temeraire, white, red-striped (one of the best of its class); Lightbody's William Penn, white, with purple edge, very fine, strongly marked ground, colour seldom pure; Melange des Beautés, red and yellow-striped (an excellent old flower, merits well known); Tyso's Alexis, yellow-spotted, extra fine, good form; Tyso's Attractor, white, with purple edge, large, very fine; Kilgour's Queen Victoria, cream, crimson-edged, large, and extra fine; Costar's Coronation, half pink mottled, very fine; Grand Monarque, yellow-edged, fine petals, rather loose; Aust's Nonsuch, white, purple-edged, distinct, very fine; Tyso's Felix, buff, with distinct spot, extra fine; Lightbody's No Mistake, cream, purple-edged, strong marking, very fine; Dr. Franklin, fine clear white, with purple edge, very fine; Tyso's Edgar, yellow-coffee-edged, excellent form, extra fine; Quentin Dureward, yellow-edged, very fine colours, rather thin; Tyso's Delectus, yellow, red-edged, very fine; Lightbody's Rob Roy, cream, crimson edge, very fine; Imbert, yellow, with faint-brown spot, very good; Tyso's Harmonius, yellow, with dark spot, extra (one of the best of its class); Herald, white, crimson-edged, very fine, excellent shape, high crown; Tyso's Creon, buff, dark edging, very

fine; Glacia, yellow-mottled, large and very fine; Paxos, white, with deep purple edge, extra fine; Biddal's Duke of Wellington, yellow, delicate-edged, very fine; Macrobius, white spotted, very fine; Lightbody's Endymion, white, with delicate rose edging, very good; Tyso's Premium, white, purple spot, very fine, high crown; Aust's Queen Victoria, white, with delicate edging, very fine; Saladin, fine yellow, with faint spot; Sophia, cream, with rose edge, very good; Tyso's Vendome, cream, with dark purple edge, extra fine, rather spotted; Waterstone's Epirus, yellow-spotted, very fine.—*Gard. Chron.*

Character Sportive.—"There is in the ranunculus what is by florists called a sportive character—that is, they run from their original colour. Some that have yellow ground, delicately spotted, will come plain yellow, and some red and white striped will come plain red; sometimes the colours will mix, and the flowers will become dingy."—*Gard. Chron.*

"Sometimes the flowers will be as green as the grass of the plants from which they grow. Some of the finest seedlings are weak, and therefore die in a few years, though for a short time they had great renown. Such has been the case with *Abbé St. Andrew*, *Quiros Viol le Vrai Noir*, *Grand Berger*, and *Rose Incomparable*, and some others of later date. But there are others of first-rate character which are remarkably strong, and increase abundantly, such as *Attractor*, *Felix*, *Saladin*, *Edgar*, *Eureka*, *Victor*, and many others."—*Ibid.*

Characteristics of a Good Flower.—"The form of the ranunculus should be two-thirds of a ball; petals, broad, thick, free from notch or indentation, cupping a little, and disposed that each cover the place where the two under ones join; commonly concealing the anthers, abundance of petals lying close over each other, and forming a compact flower, open enough to show the colour on their inside, but not enough to be loose; and the under ones must hold well in their places, forming a square, if not a hollow back. The stem thick, strong, and elastic; but the flower upright, and from one and a half to two inches in diameter. The colour is a matter of taste, but

must be dense and distinct; the purer the white or yellow, and the more contrasted the edging or spotting is, the better the flower; in selfs the more brilliant the colour is, the more likely to be attractive; but so long as the colour is decided, the only advantage that can be gained by colour is novelty. The outside of the petal should be as bright as the inside.

If shown in a stand, there must not be two alike: all the flowers in a row should be of one size, and the back row the largest."

Propagation.—By Seed.—To the Rev. Joseph Tyso we are indebted for the following directions:—

"Impregnate the double flowers with the farina of the single ones. This cannot be done with effect in every case; but whenever an old flower, with a pericarpium or eye, gather a single or semi-double flower, and apply the farina to the eye of the double flower.

"The seedlings will bear a striking resemblance to the mother plant, as to colour and habit of growth. The seed may be sown at all seasons, from the 1st of August to the 1st of March, the middle or latter end of October, and the beginning of January. Sow in boxes eighteen inches by eleven inches, and four inches deep, full of loamy earth, and the surface level. Sow the seeds about an eighth of an inch apart; cover them as thinly as possible, and water with a fine rose; but place the boxes under glass, without heat. The plants usually make their appearance in about a month. Give air day and night, except in severe frost; then cover up with straw mats. With such protection, the young plants will endure the severest seasons. Clean the surface of the boxes from green moss in February, and top dress them. Put the boxes in the open ground up to the second week in May, and water daily until the grass begins to wither; then suffer the boxes to become quite dry; and in the middle of July, take them up, and preserve the roots in bags until February, and then plant them as the general stock. In the following June they flower in great profusion."—*Gard. Mag.*

By Offsets.—"Unlike the offsets of the hyacinth and tulip, those of the ranunculus generally attain perfection in the season of their formation on the

parent plant, and are, therefore, fit to be planted as full grown tubers the same season in which they are removed. Smaller ones, which are unfit to bloom the following year, may be planted in a bed prepared, as to be directed for the full sized roots."

By Dividing the Tubers.—In minutely examining the crown of a ranunculus root, several small protuberances will be found, from each of which a shoot will arise, and the root may, therefore, be divided by a sharp knife into as many parts as there are protuberances; and thus the danger of losing any rare variety is much diminished. These sections will not bloom till the second year."—*Hort. Trans.*

Soil.—Mr. Hovy of Boston, one of the best of the American horticulturists, is quite right in recommending, as "the best soil for the ranunculus, a strong rich mellow loam; but good garden loam, enriched with very old cow manure, or leaf-mould, will answer—fresh mould, however, will insure a much better bloom."

"A somewhat moist and cool situation," says Dr. Horner, one of the best of amateur floriculturists, "is the most suitable. The bed, therefore, should be so situated that it receive but a few hours of the morning sun, and be in the lowest part of the garden. It must not be raised higher than the surrounding walks; should be two feet in depth of soil, and have board instead of box edging, that slugs, &c., which often eat the tender foliage and opening flower-buds of some varieties, may not be sheltered. The only suitable soil is a retentive loam, from the surface of a rich old pasture, the sods included; to which should be added, and well incorporated, one third of thoroughly-decayed cow manure. Fresh manure must be avoided, as the roots will not bloom where it exists, but many will perish. All hot and stimulating composts are equally pernicious. With the enriched soil just recommended, the bed should be made at the beginning of October, and finished off, and, on no account, disturbed till planting time; for it is all important that the soil be compact and close in which the roots are planted.

"The practice of putting some inches of manure at the bottom of the bed is not to be commended; the roots either

will not reach it at all, or if they do, their sudden transition into deep compost is at least unnatural: it is more consonant with reason that the food should be generally and equally distributed."—*Gard. Chron.*

Planting.—"The bed being about four feet in width," adds Dr. Horner, "and any suitable length, and having been neatly smoothed over, the roots should be planted about five inches distant from each other in rows, which, again, should be about six inches apart. If planted closer, as is commonly the case, the plants will grow comparatively weak, and bloom more sparingly.

"The situation of the rows having been marked out, holes, one and a half inch deep, should be dibbled with the finger, or other instrument, in which the roots should be compactly set, and covered over with soil, after the manner of dibbling beans, by this means the surrounding soil is not disturbed, but left close and retentive.

"The next best plan is drawing drills across the beds in rows, setting the roots therein, and then filling them up with the displaced soil; the worst of all plans being the raking the bed evenly over, setting the roots on it, and then covering the whole one and a half inch with loose soil—yet this is commonly practised."—*Ibid.*

Choice of Roots.—Mr. Glenny recommends "the middle sized, with firm tubers and plump buds, as preferable for planting; and care should be taken to place a little sand under and over each, to guard them against too much moisture."—*Gard. and Pract. Florist.*

General Management.—"About the beginning of April," says Dr. Horner, "the young plants will appear above ground, when the loosened soil should be carefully yet firmly compressed with the fingers about the roots.

"During the months of April and May, should a continuance of dry weather prevail, water may be cautiously administered at intervals in an evening, but only just so much as will prevent the soil of the bed from cracking; or a little moss, or old spent tanner's bark, &c., may be neatly placed between the rows, which will retain the moisture in the soil. The injudicious and over abundant application of water is a very common error, and one of the greatest evils. It not unfrequently hap-

pens that plants, which have looked well for a time, at length begin to turn yellow in the foliage, and the flower buds dwindle and go off.

"The dying of the leaves in some instances evidently depends on a want of vigour, or partial rot in the root; and, in some few cases, it would appear to be caused by large earthworms, forming their wide tracks amid the roots of the plants, nearly undermining them; but in the great majority of cases, it is produced by injudicious watering.

"During the expansion of the flower buds, and when they are fully blown, a stage and awning should be erected over the bed, as in the case of tulips, that rain and hot sun may be excluded; and gentle watering every second or third evening, may be given, which will keep the bed cool and moist, and promote the size of the flower. As much air should be admitted as possible, that the flower-stems be not drawn and weakened."—*Gard. Chron.*

Protection during Winter.—This is essential; and the following plan, adopted by Mr. Glenny, is excellent:—

"Let the bed be made just the size of a cucumber frame; place one of these on the bed, and if there is danger of heavy rains, or severe weather, put on the sashes. As soon as heavy frost sets in, the whole of the interior of the frame must be filled with leaves, and the sashes replaced, and a few boards laid on to keep the leaves from blowing away. In this manner, the whole may remain until April, or until all danger of frost is over, when the leaves, frames, &c., may be entirely removed."—*Gard. and Prac. Flor.*

Taking up the Roots.—Upon this point, the same excellent authority directs this to be done "a fortnight after the last flowers have faded, when the foliage looks yellowish. It is a very nice operation, and should not be done hastily. The best way is to pare off three inches of the soil into a sieve, if the bed is composed of mixed sorts, and then, by shaking out the earth, the roots will remain.

"When the varieties are named, they must be taken up singly, and put in a box correctly labeled. They must not be placed in the sun, but may be carried to a dry room, where they may remain till the earth is sufficiently dry to shake off easily, when they should

be put into paper bags."—*Gard. and Prac. Flor.*

Late Succession of Blooms.—To obtain this, we have the following directions by Mr. H. Groom, the well known florist:—

"The beds are prepared in the usual manner, the ground immediately afterwards well watered with lime water; but to destroy the worms, which are otherwise apt to draw the roots from their places; afterwards water with clear cow-dung water, until the foliage makes its appearance. The beds are then kept shaded from nine in the morning till five or six in the evening, till the bloom is over. For a bloom all the season, commence in February, and plant every fortnight or three weeks; in September, plant in a frame, and you will have a bloom about January or February."—*Hort. Trans.*

Forcing.—Mr. Bouché of Berlin, a florist, gives these directions:—

"Select tubers which have been kept three or four months, or even a year, over the season of planting, these being more easily excited than those which have been only the usual time out of the soil, plant them in pots about the beginning of August; and, by bringing these into the green-house at different periods, a bloom is kept up from October to February."—*Gard. Mag.*

RAPE, or COLESEED. *Brassica napus esculentus.* Like mustard and other small salading, it may be sown at any period of the year, when in request, being allowed a separate bed. It is cultivated as *Mustard*, which see.

To obtain Seed.—Some plants of a sowing made about the middle of July must be thinned to eighteen inches apart; they will survive the winter, and flower in the May and June of the next year. The seed, which is produced in great abundance, ripens in July and August, and must be cut as it does so, and laid upon cloths to dry, as it is very apt to shed.

RAPE (EDIBLE-ROOTED). This name may be applied to a variety of the rape mentioned by Mr. Dickson, one of the vice-presidents of the Horticultural Society. Its root is white and carrot-shaped, about the size of the middle-finger. It is much more delicate in flavour than the turnip, like which root it is cooked, only that it is not peeled but scraped, its skin being remarkably

thin. It has been cultivated for a great length of years on the continent, and for about thirty years in this country; but only by one person, as far as Mr. Dickson is aware.

Time of Sowing. It is propagated by seed, which, for the main crop, may be sown from the middle of July to the end of August, or even later. These will supply the table until April; and if wanted throughout the year, a little may be sown in the latter end of October, the plants from which will be fit for use, if they succeed during April and May: the last crop to be inserted from the middle of January to the middle of February, which will come in at the end of May and during June. On a north border, and if the soil is sandy and moist, it is possible to have them sweet and tender during the whole summer, to effect which the seed must be sown at the close of March and May.

Cultivation is the same as turnips. In dry weather the beds must be watered regularly until the plants have got three or four leaves.

Soil.—One great advantage attending the cultivation of this vegetable is, that it requires no manure. Any soil that is poor and light, especially if sandy, is suitable to it. In rich manured earth it grows much larger, but not so sweet and good.

To obtain seed.—Mr. Dickson recommends, in February or March, some of the finest roots to be transplanted to two feet asunder; but it would perhaps be a better practice to leave them where grown. The ground is to be hoed repeatedly, and kept clear of weeds. The seed must be cut as soon as ripe, and treated as directed for turnips, &c.

RAPHANUS. Three species. Hardy annuals, except *R. landra*, which is an herbaceous perennial. Seed. Rich mould. See *Radish*.

RAPHIOLEPIS. Four species. Half-hardy evergreen shrubs. Cuttings. Loam, peat, and sand.

RASPAILIA microphylla. Greenhouse evergreen shrub. Young cuttings. Sandy peat.

RASPBERRY. *Rubus idæus*.

Best Varieties.—*Red.*—Fastolff, or Bee-hive, Franconia; Antwerp, red; Barnet; Cornish; Double-bearing, and Genessee.

Yellow.—Antwerp, yellow; Cox's Honey; Old white.

The Fastolff (Fig. 142) has been "recently received from England, where it was raised or discovered near the castle of that name. It has produced fruit at Philadelphia the two past seasons, and quite equals its transatlantic character, which is *higher than that of any of its tribe*. The fruit is large, deep red, inclining to purple, well flavoured, and yielded longer than usual. Such was the description written before the fruit of the present year (1846) had matured; another season's observation has confirmed it. The annexed drawing, accurately copied from nature, has been supplied by Doctor William D. Brincklé. The plants are yet scarce, and consequently higher priced than the old varieties; but from its adaptation to our climate, it will, it is hoped, be speedily increased, and widely distributed—so valuable an acquisition one could desire to see domesticated in every garden in the land."—*Rural Reg.*

The Franconia was "imported from France some years since; it is hardy, fruitful, and may be safely recommended as in all respects desirable. This is, perhaps, taking all its merits into account, next in value to the Fastolff."—*Rural Reg.*

Propagation by Seed.—New varieties are easily raised from seed. Wash away the pulp from some of the finest thoroughly ripe fruit, dry the seed, and sow it the same autumn in a dry border, giving it the shelter of a frame through the winter. Trim and plant out the seedlings to remain in the autumn following, and they will bear in the succeeding summer.

By Suckers.—These spring from the root annually, and grow from three to five feet in height the same year, forming plants by autumn or winter for transplanting, to bear fruit the following summer.

Planting may be done any time from October till March, the earlier the better, in open weather. Raise the plants carefully with plenty of fibres; shorten any long straggling root; and cut off any naked woody part of the root of the old stool, observing at the same time, if one or more buds appear near the root, they, being the embryo of future shoots, must be very carefully preserved; and shorten each sucker at top to about three or more feet long, according to their strength—they are



RASPBERRY.

then ready for planting: having previously to this chosen an open spot of good ground and trenched it, put in the plants as soon as possible, in rows a yard and a half apart, and a yard asunder in the rows. If planted closer the plants, producing numerous suckers in summer, grow so close as to exclude the due influence of sun and air from the fruit, as well as render it troublesome to gather the produce. If the planting is performed late in the spring, give a good watering, and repeat it occasionally till the plants have struck fresh root.

After-Culture.—Keep them clean from weeds all summer by broad hoeing, giving an annual dressing in autumn, cutting down the decayed stems that bore the preceding summer. Thin the young succession bearers; clear away all intermediate suckers between those of the main stocks; and then point with a fork the ground between the rows.

Previous to the above-mentioned annual dressing of raspberries, observe that, as they produce a fresh supply of shoots or suckers every year for bearing the next, therefore the annual dressing be performed any time from October till March. First proceed to clear out all the decayed stems, being last summer's bearers, breaking them down close to the bottom; then examine the supply of young shoots for next year's bearing. In March select three or four of the strongest shoots on each stool, cutting all the others away close to the ground; shorten those left according to their strength, cutting them generally a little below the bend, at the top of the shoots, to about three or four feet in length, both to render them more robust, to support themselves more firmly upright in summer, and to promote a stronger supply of laterals for flowering and fruiting. Allow them a little rotten dung or leaf-mould once every other year, applying it in the spring. Make a plantation every four or five years in a fresh spot of ground; as, after that period of time, the plants, although they may continue shooting with tolerable vigour, yet are apt to be less fruitful, and the fruit smaller, than in younger plantations in fresh ground.—*Abercrombie*.

Autumn Crop.—To obtain of the Antwerp, and other large varieties,

Mr. Mearns recommends, "in May the removal of the young fruit-bearing shoots from the canes, leaving in some cases one or two eyes, in others cutting them clean off. Under either plan they soon show an abundance of vigorous shoots, frequently three or four from each eye, which produce plenty of blossoms in the beginning of July, and on these a good crop of fine raspberries is borne in August."—*Hort. Trans.*

Training.—The earliest and finest are obtained from canes planted beneath a south wall, and trained against it in this form. (Fig. 143.) But in the open ground the best mode of training is round small hoops, thus. (Fig. 144.) The worst form is plaiting the canes together; and training in arches or other compact forms, excluding the light and warmth of the sun, is little better.

Fig. 143.

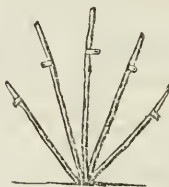
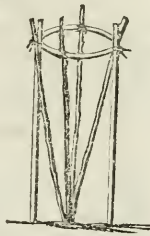


Fig. 144.



Forcing.—Raspberries may be forced growing either in pots or in the borders of the house. They may be also planted on the outside of a pit, the bearing canes being introduced withinside and trained to a trellis, whilst the present year's shoots are left outside.

RATABIDA columnaris, and its variety. Hardy herbaceous perennials. Division or seeds. Common soil.

RATTLESNAKE FERN. *Botrichium virginicum*.

RATTLESNAKE ROOT. *Polygala senega*.

RAUWOLFIA. Four species. Stove evergreen shrubs or trees. Cuttings. Loam, peat, and sand.

REAUMURIA. Two species. Half-hardy evergreen shrubs. Young cuttings. Loam, peat, and sand.

RED BAY. *Laurus carolinensis*.

REDCEDAR. *Juniperus virginiana*.

RED GUM TREE. *Eucalyptus resinifera*.

RED NIGHTSHADE. *Erica Hali-*
cabala.

RED SPIDER. See *Acarus.*

REEDS. See *Shelter.*

REEVESIA *Thyrsoidea.* Green-house evergreen shrub. Ripe cuttings, with the leaves. Light turfy loam, or loam and peat.

REHMANNIA *chinensis.* Hardy herbaceous perennial, but it succeeds best in a cool green-house. Cuttings. Common soil.

REICHARDIA *hexapetala.* Stove evergreen shrub. Cuttings. Rich soil and a strong heat.

RELHANIA. Five species. Green-house evergreen shrubs. Cuttings. Loamy soil.

RENANTHERA. Three species. Stove orchids. Cuttings. Peat mixed with broken potsherds, moss, or wood.

RENDLE'S TANK SYSTEM. First suggested, I believe, by Mr. Rendle, nurseryman, of Plymouth. I have given, in the customary monthly calendars, the necessary intimations when the bark-beds will probably require stirring, but those troublesome, uncertain, and dangerous operations, dangerous to the plants, are entirely rendered needless by Mr. Rendle's plan. It has been adopted by some of the best practical gardeners with entire satisfaction.

A tank of iron or wood, twenty feet long, five feet broad, and six inches deep, is constructed in the centre of the house, and surrounded by a walk, except at the end, where the boiler is fixed for heating it. The top of the tank is covered with large slabs of slate, cemented together, to prevent the excessive escape of steam. Around this is a frame sufficiently high to retain the bark, in which the pots are plunged. The boiler and tank are filled with water, and this circulates, when the fire is lighted under the former, by means of two pipes, one from the top of the boiler, and the other returning nearer to its bottom. The expense of piping, and danger of their freezing, is avoided; the fire only requires to be kept lighted for two hours at night, and again for the same period in the morning; the water, when once heated, retaining its temperature for a long time. In a small house, the apparatus can be constructed for 5*l.*, and in all, for less than half the cost of hot-water pipes. The saving

in tan and labour is also very great; in some places tan is expensive, and where it is cheaper, the trouble and litter incident to its employment, and the dangers of loss from fungi and insects, of which it is the peculiarly fertile foster-parent, render it objectionable as a source of heat. And whenever the tan has to be renewed, the trouble and destruction of plants is always great.

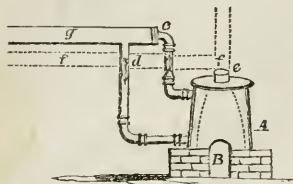
"In my new propagating house," says Mr. Rendle, "the tank or cistern is placed in the centre, with a walk surrounding it, so as to enable the propagator with greater ease to attend to the plants, &c.

"On the outside of the house is a fire-shed, in which the boiler is fixed. The tank, made of wood, one and a half or two inches thick, which I find the cheapest material, (it also prevents the water cooling so fast as it does either in stone or iron,) may be lined with lead or zinc. Exactly in the centre of the tank is a partition, serving the double purpose of causing the water to circulate, (as well as to support the edges of the slates,) an aperture being left in the partition, of about two inches in breadth, to allow the water a free passage. The flow-pipe enters near the appendage of the tank, at the mouth of which pipe a piece of perforated copper is placed, as also at the return-pipe, to prevent dirt and sediment from finding its way into the boiler. After everything is properly fixed, the tank is filled with water, which, of course, at the same time fills the boiler. . . . The tank is about four inches deep. Across it, and resting on its sides, are placed slate stones about an inch and a half thick, cut square at the edges. These are fastened to each other by Roman cement, or Aberthaw lime, to prevent a superfluity of steam from escaping into the house. . . . Around the edges of the slates a piece of inch board, about nine inches deep, should be placed to enclose the sawdust, sand, moss, or other plunging material."

In the following sketch, for which, as well as for the next, I am indebted to Mr. Rendle, *A* is a transverse section of Rogers's conical boiler; *B* is the fireplace; *g*, the tank; *c*, the flow-pipe; *d*, the pipe by which the water returns to the boiler; *e*, is the hole for the smoke, which, joined to a flue, *f*,

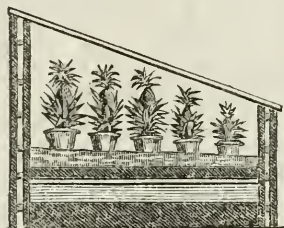
can be made either to ascend the chimney at once, or to pass round the house.

Fig. 145.



The next sketch is a Pinery, fitted up with Mr. Rendle's tank.

Fig. 146.



It is described as "a very useful and most desirable structure for the growth of the Pine Apple, with a hollow wall, recommended by all garden architects in preference to a solid wall—the heat or cold being not so readily conducted as through a solid mass of masonry." Mr. Rendle might have added, that hollow walls are also much drier.—*Rendle's Treatise on the Tank System. See Stove, &c.*

REQUIENIA obcordata. Stove evergreen shrub. Young cuttings. Peat, loam, and sand.

RESEDA. Mignonette. Seventeen species. Chiefly hardy annuals, biennials, herbaceous perennials, and a few green-house evergreens. Cuttings or seeds. Light rich soil. See *Mignonette*.

RETARDING requires as much skill as forcing, for as the latter requires the application of all that is suitable to the promotion of a plant's rapid healthy growth, so retarding requires the withholding from it of those contingencies. Thus to retard growth, the lowest tem-

perature, and the least degree of light compatible with healthy growth must be secured; and to this end plants for succession are often placed on the north side of a wall.

Then again, as in the case of raspberries and strawberries, plants are often cut down in the spring, compelling them to form fresh foliage and stems, and thus be productive in the autumn instead of the summer.

The vegetation of many bulbs may be prevented by merely keeping them dry, and, indeed, the withholding the usual supply of water, giving it only in diminished quantities, is necessary in all retarding treatment. To secure the entire quiescence of bulbs, and of such plants as will bear so low a temperature, the atmosphere of the ice-house is effectual; and to this end it should have a few shelves for the support of boxes or flower pots. Banks of earth ranging east and west, and facing the north at a very acute angle, are very useful in retarding the early advance to seed in hot weather, of spinach, lettuces, &c. Espaliers ranging similarly, and shaded during the whole of March, and the two following months, will blossom later and more unfailingly than trees more exposed to the sun in spring. Similar exclusion of heat and light retards the ripening of picked fruit, and if the air be excluded from them, or its oxygen withdrawn, fruit will remain unripened for weeks. To effect this, put a paste formed of lime, sulphate of iron, and water, at the bottom of a wide-mouthed glass bottle, then a layer of large pebbles to keep the fruit from the paste,—then fill the bottle with peaches, apricots, or plums, gathered a few days before they are ripe, cork the bottle tight, and cover the cork with melted resin. They have been thus kept for a month, and summer apples and pears for three months. They ripen when again exposed to the air.

RHAMNUS. Thirty-eight species. Chiefly hardy evergreen, or deciduous shrubs, or trees. Layers, seeds. Common soil. The few stove and green-house kinds, increase by cuttings; and require a light soil.

RHAPIS. Two species. Dwarfish palms. Suckers. Sandy loam.

RHAPONTICA. Four species. Hardy herbaceous perennials, except

R. pulchra, which is a biennial. Division. Common soil.

RHEEDIA *javanica*. Stove evergreen tree. Ripe cuttings. Peat, loam, and sand.

RHEMANEIA *chinensis*. Hardy shrub. Cuttings and layers. Rich light loam.

RHEUM. Rhubarb. Fifteen species. Hardy fusiform-rooted perennials. Division or seed. Rich loamy soil. See *Rhubarb*.

RHEXIA. Four species. Hardy herbaceous perennials. Division. Peat soil.

RHINOPETALUM *karelini*. Hardy tuberous-rooted perennial. Offsets. Light rich soil.

RHIPODENDRON *plicatile*, and its variety. Green-house evergreen shrubs. Suckers or leaves slightly planted. Sandy loam and peat.

RHODANTHE *manglesii*. Green-house annual. Dr. Lindley recommends that "its seeds should be sown at two seasons: the first about the beginning of September; the second about the end of February. The soil the seeds are sown in should be rather strong, but not rich, for the first sowing, consisting of a mixture of sandy loam and leaf-mould. They should be sown in pots and placed in a cold pit or frame, if sown in the autumn, which should be kept close until the plants are up. The young plants should be potted off when small, for if allowed to get large before potting, they never do any good; put a single plant into a small sixty-pot, they must then be returned to the pit or frame, and kept close until they recover the effects of the shift; afterwards harden by admitting air. Then when there is danger of frost, remove them to an airy part of the green-house for the winter, taking care that they are not over watered; for much depends on the manner in which they are treated during the winter, as too much or too little water will destroy the healthiest plants in a short time. In the spring, February, repot them into a richer but light sandy soil, and place them in a warmer and moister situation, and pinch off all the first flowers as they appear.

"The spring-sown plants may be treated like other half-hardy annuals, only they must have plenty of air to keep them from being drawn up weakly."—*Gard. Chron.*

RHODODENDRON. Twenty-six spe-

cies, and many varieties. Hardy and half-hardy evergreen shrubs, except *R. rhodora*, which is deciduous and hardy. *R. ponticum*, Common Rhododendron. *R. maximum*; *R. Caucasicum*; *R. campanulatum*; and *R. Catawbiensis*, are the best hardy species. It is to be regretted that such a noble evergreen shrub as *R. maximum* should be so seldom seen in our grounds. Here in the United States, where it is indigenous, it is really less known than in England, where it forms one of the main features of the undergrowth in lawns and pleasure grounds,—when will Americans learn to estimate as they deserve, their own natural products! From the above named species have been obtained the following superior

Varieties.—*R. Russellianum*, scarlet; *R. Loweii*, pale straw; *R. tigrinum*, pale rose; *R. nobleanum*, dark red; *R. splendidum*, (Cunningham's,) white; *R. altaclerence*, scarlet; *R. multumaculatum*, pale rose, spotted; *R. arboreum roseum*, bright rose; *R. Victoria*, deep red; *R. venustum*, pink; *R. augustum*, pale flesh spotted; *R. pulcherrimum*, scarlet; *R. grandiflorum*, (Cunningham's,) pale flesh; *R. macranthum*, rose; *R. Knightii*, scarlet; and *R. Carnarvonianum*, bright rose.

Hybrids with Azalea.—*R. Adonsonii*; *R. Azaleoides*; *R. azaleoides album*; *R. fragrans*; *R. luteum*; and *R. Gow-erianum*.

Green-house Species and Varieties.—*R. anthopogon*, purple; *R. arboreum cinnamomeum*, reddish purple; *R. lapponicum*, crimson; *R. setosum*, purple.

Characteristics of Excellence.—Mr. Glenny gives the following good criteria:—"The flower large, circular, and campanulated, or hollow like a globular cup. The five divisions of the petals should be concealed by means of the lapping over. The petal thick, smooth-edged, and stiff. The truss, pyramidal or dome-shaped, standing clear of the foliage; the flower compact, touching, but not crowding each other; footstalks stiff and elastic. The colour brilliant, the spots distinct and contrasted, and stand well without fading. The plant should be bushy, the foliage bright, clear, green, large, and disposed all round the branch, especially round the flower; the stems should be well covered with leaves, and the bloom should be abundant. It should not bloom

until the middle of May, if hardy, for those flowering before the frosts have ceased, have the blooms spoiled.”—*Gard. and Prac. Flor.*

Propagation.—By Seed.—The same good floricultural authority gives these excellent directions:—“The seed vessels must be gathered as soon as ripe, and before they burst; let them lie in a drawer in the stove or green-house, or a sunny window, to burst and give out their seed: sow immediately; and, to sow thin enough, mix it with twenty times its quantity of the smallest sand. Sow in pots with good drainage, and the following compost. One half rich loam, such as the top spit of an old meadow, sifted through a coarse sieve; the other half the best peat or bog earth, such as is formed of the half-decayed fibres broken into pieces and rubbed through the same sieve; by knocking the bottom of the pan or pot on the potting table or bench, the compost will be solid enough without pressing; level it and sow very thinly; then with a fine sieve, sift a little of the compost on the seeds very evenly, and only just enough to cover them; over this put a little fine sand, not more than one sixteenth of an inch deep. Take a brush about the texture and strength of a clothes brush, dip it in water, turn its hairs upwards, pointing at the seeds, draw your hand along the hairs towards you, and they will throw off an almost imperceptible shower of moisture, by means of which the whole surface can be fairly wetted without disturbing a seed or a grain of the compost. When the seedlings have four good leaves, prick out into other pans of the same kind of compost, three inches apart, carefully raising them without disturbing the surface to hurt the more backward seedlings, and the pan may be put back to its place, for the seeds will continue coming up for a considerable time. When pricked out, they should be watered, and afterwards regularly. Though in the green-house keep them under hand-glasses for a few days, until re-established, after which they may be removed to a cold frame, or put out of doors. Shade from the mid-day sun, weed regularly, and carefully tend until they have grown to touch each other. They should then be potted in sixties in the same kind of soil. They have now only to be kept from getting dry, which in such small

pots requires much care; the best and easiest way is to plunge the pots to the rim in coal ashes, and still have frames over them for the purpose of preserving them from excessive wet, heat, and cold. When they have perfected a second growth, and are resting, shift them into forty-eight sized pots, and treat them as before, and so continue shifting from size to size until they flower.”—*Gard. and Prac. Flor.*—*Gard. Chron.*

Raising Varieties is best done in April from forced plants, the two intended to be bred from being brought into bloom at the same time. They should be widely different in colour, or form, or habit, or some peculiarity which may be desirable to combine in one. Hybrids may be obtained by impregnating the *Rhododendron* with pollen from the *Azalea*.

Grafting.—Mr. Glenny gives these directions:—“Young plants of the *R. Ponticum* must be potted and well established before you want to use them. Cut them down within three inches of the pot, and adopt the mode of *saddle grafting*. See *Grafting*.

“Let the bark of the stock and scion touch, if possible, all over; but as the stock may be, and often is, the largest, let the bark fit perfectly on one side, and fall short on the other. The plants should be placed after the operation in a garden frame kept from the air for a day or two, and shaded altogether from the sun. Side-grafting and inarching are better modes of increase for the *Rhododendron* than saddle-grafting. In order to insure success, August or September is the best time for budding or grafting *Rhododendrons* in the open air. This plant being thin-rinded does best by side-grafting, and buds of it had also better be inserted after the manner of side-grafting, with a portion of the soft wood retained behind the bud.”—*Gard. Chron.*—*Gard. and Prac. Flor.*

Grafting may be done at almost any season of the year, and even the Chinese *Azalea* may be inarched upon them. In summer, if a low stock be employed, it is sufficient to turn over it a hand-glass; but if the grafting be in the spring or autumn, to obtain success a little bottom heat is necessary.

Other Modes of Propagation.—Layering and inarching may both be successfully practised with the *Rhododen-*

dron, but require no particular directions. Cuttings will also sometimes succeed, and if a branch is desirably removable let it be cut off. The cuttings should be only half ripe. Plant in a large sized pot, two-thirds full of the compost, cover with a glass, fitting within the rim of the pot: place in a frame, with a trifling bottom-heat, or in a common propagating house; or, for want of a better accommodation, in a green-house or cold garden frame. The glass must be wiped clean every morning, and the sand kept moist. Neglect of watering is fatal. When the cuttings are struck they must be treated as seedlings.—*Gard. and Prac. Flor.*

Soil for Out-door Kinds.—A light loam, manured annually with a mixture of peat and leaf-mould suits them best. The subsoil should be retentive, for if very dry they will not flourish.

Pruning.—They require but little pruning, except to remove superfluous branches, &c., and this is best done in April. Mr. Glenny says that old plants which have become bare at the bottom are easily converted into standards by selecting the largest bare stem, cutting all the rest away, and pruning the head into shape. If the stem be growing out slopingly, you have only to dig up the plant and place it upright.

Green-house Culture.—Whilst growing, that is from about the end of April to the middle of June, keep them in a temperature of which the extreme at night and in the day are 45° and 60°. Supply them liberally with water during that time, and then remove them to a cool situation out of doors, otherwise they will be super-luxuriant and not flower.

Forcing.—To obtain early flowers, place some potted plants in a very gentle heat the last week in December.

RHUBARB. *Rheum rhaponticum*, *R. hybridum*, *R. undulatum*, and *R. palmatum*. This last is the medicinal, or Turkey Rhubarb of the shops—the esculent one or pie-plant, as it is familiarly termed, has become quite a common inmate of our American gardens; its early growth, affording facility for pies and tarts, long before green fruit can be obtained, and its close resemblance in flavour to the gooseberry, render it almost indispensable.

Varieties.—There are several varieties, of which the most preferable are

the Tobolsk; Gigantic; Victoria, (best); and Bucks or Ellford.

Soil and Situation.—The soil best suited to these plants is light, rich, deep, unshaded, and moderately moist. A poor heavy or shallow soil never produces them in perfection.

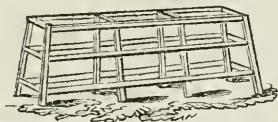
Sowing.—It may be propagated by cuttings, but the mode almost universally practised is by seed. Sow soon after it is ripe, in September or October, for if kept out of the ground until the spring, it often continues dormant for twelve months: if the danger of this, however, is risked, sow early in February or March, in drills three feet apart, and an inch deep, the plants to remain where raised; for although they will bear removing, yet it always checks and somewhat lessens their growth. When they make their appearance in the spring, and have been thoroughly cleared of weeds, thin to six or eight inches asunder, and let the surface of the ground about them be loosened with the hoe. At the close of summer, when it can be determined which are the strongest plants, finally thin to three or four feet, or the Gigantic and Victoria to six. In autumn remove the decayed leaves, and point in a little well putrefied stable-dung, and earth up the stools. In the spring hoe the bed, and as the stalks when blanched, are much less harsh in taste, require less sugar to be rendered palatable, and are greatly improved in appearance, dig a trench between the rows, and the earth from it place about a foot thick over the stool. This covering must be removed when the cutting ceases, and the plants allowed to grow at liberty. As the earth in wet seasons is apt to induce decay, the covering may be advantageously formed of coal ashes or drift sand.

To obtain Seed.—Those plants produce the seed in greatest perfection that are not gathered from, but on no account must they be subjected to the process of blanching. Two year old plants often produce seed, but in their third year always. It must be gathered as soon as ripe, and great care taken that none is scattered over the beds, for the plants thence produced often spring up, and greatly injure the old plants by growing unobserved amongst them.

Forcing.—Plant a single row three feet apart in ground that has been trenched two spades deep, and dressed

with well putrefied dung at the time. The forcing may commence in December; first cover either with sea-kale or common garden pots (twelves), but chimney pots are still better, the leaf-stalks becoming much longer and finer, and envelope them with fermenting dung. When well up, the pots are removed, except when chimney pots are used, and large hand-glasses substituted; covering is required every night, and in dull weather with thick mats. By this mode the plants are very liable to be broken, as their leaves soon touch the sides. A frame is much less objectionable, formed by driving stakes into the ground on each side of the bed, alternating with the plants. These are to be three feet high above ground, and the space between the two rows of stakes two feet at the bottom, but approaching each other, and fastened by cross pieces, so as to be only fifteen inches apart at top. To the sides and top stout laths are fixed to prevent the dung falling upon the plants, as represented in the accompanying sketch.

Fig. 147.



The dung may either be fresh, or that which has previously undergone fermentation, and placed all round the frame eight or ten inches thick, and the top covered with long litter. The temperature in the interior should have a range from 55° to 60° . If it rises higher, two or three large holes made through the top soon corrects it.

A frame renders hand-glasses or any other cover unnecessary, requires much less attention, and produces plants of excellent quality. Rhubarb may be forced without either pots or frame, by merely covering the plants six inches deep with light litter, care being taken that the plants are not injured.

Mr. Knight's mode of forcing is to place "in the winter as many plants as necessary in large deep pots, each pot receiving as many as it can contain, and the interstices entirely filled up by fine sandy loam, washed in. The tops of

the roots are placed on a level with each other, and about an inch below the surface. These being covered with inverted pots of the same size, may be placed in a vinery or hot-bed, and on the approach of spring, probably any time after January, any room or cellar will be sufficiently warm. If copiously supplied with water, the plants vegetate rapidly and vigorously, and each pot will produce three successional cuttings, the first two being the most plentiful. As soon as the third is gathered, the roots may be changed, and those removed replanted in the ground, when they will attain sufficient strength to be forced again in a year's time. If not, it is of little consequence, for year-old roots raised from cuttings, or even seed sown in autumn, are sufficiently strong for use."

Propagation by Division.—Mr. Rogers, a successful cultivator, says, that "when the rhubarb is propagated by the root, care must be taken to retain a bud on the crown of each offset, together with a small portion of the root itself, with, if possible, some fibres attached to it. These offsets may be taken from roots of three or four years old, without injury to the plant. They may be planted where they are intended to remain, at the same distance and in the same manner as advised for the seedlings."

Taking for Use.—"Scrape away a little of the earth, then bend down the stalk you wish to remove, and slip it off from the crown without breaking it, and without using a knife. The stalks are fit to gather when the leaves are but half expanded, but a larger produce is obtained by letting them remain till full grown."—*Gard. and Pract. Flor.*

R H U S. Seventy-seven species. Chiefly green-house evergreen shrubs; some hardy deciduous trees, shrubs, and climbers, or creepers. The stove and green-house kinds increase by ripe cuttings, the hardy species by cuttings and layers. Common soil suits them all.

RIBES. Forty-four species and many varieties. Hardy deciduous shrubs. Cuttings. Common soil. See *Currant* and *Gooseberry*.

RICHARDIA *athiopica*. Green-house herbaceous perennial. Offsets. Light rich soil.

RICHIEA *fragrans*. Stove ever-

green climber. Cuttings. Loam, peat, and sand.

RICINUS. Eight species. Half-hardy annuals and green-house evergreen shrubs. Seeds and cuttings. Rich soil. *R. communis* produces the Castor Oil.

RICOTIA lunaria. Hardy annual. Seeds. Light sandy soil.

RIDGING is digging the soil into $\Lambda\Lambda\Lambda$ parallel ridges in this form—so as to expose it thoroughly to the action either of the atmosphere or of frost.

M. Schluber says, "that freezing reduces the consistency of soils most remarkably, and that in the case of clays and other adhesive soils, the diminution of this consistency amounts to at least fifty per cent."

In hoeing clay he found it reduced from sixty-nine to forty-five of the scale already stated, and in the ordinary arable soil from thirty-three to twenty. He satisfactorily explains this phenomenon, by observing that the crystals of ice pervading the entire substance of the frozen soil, necessarily separate the particles of earth, rendering their points of contact fewer.

Ridging, however, should not be confined to the winter, for in summer the extra exposure to the air and heat is highly promotive of vegetation—it impregnates the soil with oxygen, promotes the decay of stubborn vegetable remains, and disturbs predatory vermin.

Mr. Barnes says, "I keep all ground, as soon as a crop is done with, well trenched, burying all the refuse I possibly can in a green state, casting the earth into rough ridges, tumbling those ridges over with a strong fork on frosty mornings in winter and spring, and during hot sunny days in summer, continually changing the crops. Keeping the hoe at work at all seasons in suitable weather, forking up all odd corners and spare ground without loss of time. By this management, I find the ground is always in good condition and never tired by cropping, some judgment only being exercised in applying such properties again to the soil that have been taken from it, or that are likely to be required by the succeeding crop."

An effectual mode of ridging is thus described:

"Let *a, b, c, d*, represent a section of the ground to be trenched two feet

Fig. 14S.



deep. In the first place the ground is measured out in longitudinal beds four feet wide; this done, the top spit of the bed *c*, is laid on the bed *g*, and the second spit of the bed *c*, is laid on *h*. The first or top spit of the bed *f*, is then laid on *h*, so that the top soil and sub-soil are kept on separate and alternate beds, and may be mixed, reversed, or returned as taken out, at the will of the operator. By this method the advantages are—much greater exposure of surface to the action of the weather; the opportunity of incorporating with the soil any desirable or obtainable manures, and at any desired depth; a thorough blending of the soil to the depth of two or three feet; and it also facilitates the operation of draining, where necessary. It is needless to add, that when the first thrown-out beds are sufficiently pulverized, they are levelled down, and others thrown out in the same manner; *g, h, i*, represent the ridges thrown out and left as rough as possible."—*Gard. Chron.*

RIGIDELLA flammea. Stove tuberous-rooted perennial. Offsets or seeds. Light rich soil.

RINGING is a practice adopted for the purpose of checking the return of the sap, and thereby confining a larger supply to the blossom. It is removing an entire zone of bark, about an inch wide, around the branch to be rendered more fruitful, and taking care that the bark be completely removed down to the very wood. This was designated the ring of Pomona, but it certainly was not auspiciously received by that deity; for although it renders the part of the branch superior to the wound more fruitful for two or three seasons, yet it renders the branch unsightly by the swelling which occurs around the upper lip of the wound, and is always followed by disease and unfruitfulness. See *Ligature*.

RIPOGONUM. Two species. Green-house evergreen climbers.—Young cuttings. Loam and peat.

RIVEA liliifolia. Stove evergreen twiner. Cuttings. Rich loam and peat.

RIVINA. Seven species. Stove evergreen shrubs. Seeds or cuttings. Light soil.

ROBINIA. Seven species and many varieties. All hardy deciduous trees, except *R. guineensis* and *R. purpurea*, which are stove evergreens. Increased by young cuttings. Loam, sand, and peat. The hardy kinds are increased by layers or grafts, and require only common soil.

ROCAMBOLE. *Allium Scorodoprasum*. Sometimes called *Spanish Garlic*, has its bulbs or cloves growing in a cluster. The stem bears many bulbs at its summit, which as well as those of the root are often preferred in cooking to garlic, being of much milder flavour.

Time of Insertion.—It is best propagated by the root bulbs, those of the stem being slower in production. The plantation may be made either in February, March, or early part of April, as well as throughout the autumn, in drills or by the dibble, in rows six inches apart each way, and usually two inches within the ground; though the plants would thrive better if grown on the surface as recommended for the shalot. In other respects they are cultivated as directed for *Garlic*. A very small bed is sufficient for the supply of the largest family.

ROCHIA. Three species. Greenhouse evergreen shrubs. Partly dried cuttings. Sandy loam, peat, and brick rubbish.

ROCKET. *Hesperis*.

ROCK ROSE. *Cistus* and *Convolvulus Dorycnium*.

ROCK-WORK. "Mere rocks, unless they are peculiarly adapted to certain impressions, may surprise, but can hardly please; they are too far removed from common life, too barren and inhospitable, rather desolate than solitary, and more horrid than terrible. So austere a character cannot be long engaging if its rigour be not softened by circumstances, which may belong either to these or to more cultivated spots; and when the dreariness is extreme, little streams and waterfalls are of themselves insufficient for the purpose: an intermixture of vegetation is also necessary, and, on some occasions, even marks of inhabitants are proper.

"If such a scene occurs within the

precincts of a park or a garden, no expense should be spared to meliorate the soil, wherever any soil can be found. Without some vegetation among the rocks, they are only an object of curiosity or a subject of wonder; but verdure alone will give some relief to the dreariness of the scene, and shrubs or bushes, without trees, are a sufficiency of wood. The thickets may also be extended by the creeping plants—such as pyracantha, vines, and ivy—to wind up the sides, or cluster on the tops of the rocks; and to this vegetation may be added some symptoms of inhabitants, but they must be slight and few: the use of them is only to cheer, not to destroy the solitude of the place; and such therefore should be chosen as are sometimes found in situations retired from public resort. A cottage may be lonely, but it must not here seem ruinous and neglected; it should be tight and warm, with every mark of comfort about it, to which its position in some sheltered recess may greatly contribute. A cavity also in the rocks rendered easy of access, improved to a degree of convenience, and maintained in a certain state of preservation, will suggest similar ideas of protection from the bitterest inclemencies of the sky, and even of occasional refreshment and repose. But we may venture still further. A mill is of necessity often built at some distance from the town it supplies; and here it would at the same time apply the water to a use, and increase its agitation. The dale may, besides, be made the haunt of those animals—such as goats—which are sometimes wild and sometimes domestic, and which, accidentally appearing, will divert the mind from the sensations natural to the scene, but not agreeable if continued longer without interruption.

"These, and such other expedients, will approximate the severest retreat to the habitations of men, and convert the appearance of a perpetual banishment into that of a temporary retirement from society.

"When rocks retire from the eye down a gradual declivity, we can, by raising the upper ground, deepen the fall, lengthen the perspective, and give both height and extent to those at a distance. This effect may be still increased by covering this upper

ground with a thicket, which shall cease, or be lowered, as it descends. A thicket, on other occasions, makes the rocks which rise out of it seem larger than they are. If they stand upon a bank overspread with shrubs, their beginning is at the least uncertain, and the presumption is that they start from the bottom.

“Another use of this brushy underwood is, to conceal the fragments and rubbish which have fallen from the sides and the brow, and which are often unsightly.

“Rocks are seldom remarkable for the elegance of their forms; they are too vast and too rude to pretend to delicacy; but their shapes are often agreeable, and we can affect those shapes to a certain degree—at least we can cover many blemishes in them by conducting the growth of shrubby and creeping plants about them. For all these purposes mere underwood suffices; but for greater effects larger trees are requisite. They are worthy of the scene, and not only improvements but accessions to its grandeur. We are used to rank them among the noblest objects of nature; and when we see that they cannot aspire to the midway of the heights round them, the rocks are raised by the comparison. A single tree is, therefore, often preferable to a clump; the size, though really less, is more remarkable; and clumps are, besides, generally exceptionable, in a very wild spot, from the suspicion of art which attends them. But a wood is free from that suspicion; and its own character of greatness recommends it to every scene of magnificence.

“On the same principle, all the consideration which can be should be given to the streams. No number of little rills are equal to one broad river; and, in the principal current, some varieties may be sacrificed to importance. But a degree of strength should always be preserved. The water, though it needs not be furious, must not be dull; for dignity, when most serene, is not languid; and space will hardly atone for want of animation.

“Inhabitants furnish frequent opportunities to strengthen the appearances of force by giving intimations of danger. A house placed at the edge of a precipice—any building on the pinnacle of a crag—makes that situation seem form-

idable, which might otherwise have been unnoticed. A steep, in itself not very remarkable, becomes alarming when a path is carried aslant up the side. A rail, on the brow of a perpendicular fall, shows that the height is frequented and dangerous; and a common foot-bridge, thrown over a cleft between rocks, has a still stronger effect. In all these instances the imagination immediately transports the spectator to the spot, and suggests the idea of looking down such a depth; in the last that depth is a chasm, and the situation is directly over it.

“If the body of the rock is intended to be raised much above the ground level, a quantity of soil and rubbish should be carried into the centre of the space. This soil, besides serving to support the rockwork, will also form a border for the plants to grow in. Having at hand plenty of large rough stones, broken bricks, or stony rubbish of any kind or colour, proceed with these to imitate the form of natural rock as nearly as possible. Rough, bold, angular projections, and deeply-formed chasms, are the principal features in natural scenery which please us most. A rock, with a flat unbroken surface, whether horizontal or perpendicular, presents too much sameness to be pleasing to the eye: therefore, in imitating nature, the projections should be varied and bold, and unless raggedness and intricacy form principal features in its composition, it will lose much of its effect. If the rock-work be on a large scale, it should not be one continued line, but broken at intervals, in one part lost beneath the surface of the earth, and again rising in another part and resuming its sinuous form.

“So far there is little difference between this and the common method of making artificial rock. When, however, every stone has been arranged to suit the eye, the interstices between them are to be filled up with any kind of rough mortar. Of course fissures, and similar places intended for the plants which are to cover the rock, must be left open, so that the roots may penetrate to the soil beneath the stones. The next operation is to daub the whole mass over with Roman cement. For this purpose the latter should be mixed with water until it is of the consistence of thick paint, in which state it may be

applied to the stones with a large painter's brush. The spaces between the stones having been filled with rough mortar prevents the cement from being wasted. The thickness of the latter on the stones need not be more than the eighth of an inch: it will unite the whole into one mass; and rock-work, thus constructed, is beyond all comparison far more natural than that made in the usual way. It has none of that disjointed appearance which usually accompanies rock-work made without cement. After a few months' exposure to the weather, rock-work thus formed (if skillfully made) cannot without careful examination be distinguished from a natural mass; it will soon cover all but the most prominent parts. If the cement be of a colour too light, which, for some situations, may be the case, a little lamp-black, or soot, may be mixed with it. Care must, however, be taken that no substance which may make the cement more porous is used, otherwise it will peel from the stones after a hard frost. For the benefit of those who are not accustomed to using cement, I may mention that no more should be moistened at once than can be used in a short time. If the cement be good it will quickly harden, and will then be in a manner useless.

"In preserving cavities in the rock for plants, care should be taken that no places are left in which the water may lodge, or, in frosty weather, the ice, by expansion, would split and peel off the thin crust of cement, or lowest part of them, communicating with the soil beneath the stones, so that the water may drain off.

"In making artificial rock for waterfalls, or other constructions, where the cement may be constantly exposed to the action of water, the best water-cement should be used. Any preparation that does not quickly indurate under water, will, in a short time, be washed away, and leave nothing but the bare stones."—*Wheatey*.

Plants suited for Rock-work are:—*Rhododendron ferrugineum*; *R. hirsutum*; *Arctostaphylos Uva ursi*; *Chamaedendron procumbens*; *Sedum rupestre*; *S. Forsterianum*; *S. populifolium*; *S. villosum*; *S. hexangulare*; *Arbutus phillyreæfolia*; *A. pilosa*; *Mahonia aquifolium*; *Ramondia pyrenaica*; *Soldanella alpina*; *Androsace villosa*; *Crydalis*

nobilis; *Phlox ovata*; *P. subulata*; *P. nivalis*; *Vinca minor*, *florepleno*; *Campanula pumila*; *Gentiana verna*; *Dryas octopetala*; *Digitalis lutea*; *Sibthorpia europæa*; *Arabis alpina*; *Draba azoides*; *Premianthes purpurea*; *P. Muralis*; *Antennaria plantaginea*; *Gnaphalium arenanum*; *Polypodium vulgare cambricum*; *P. dryopteris*; *Onoclea sensibilis*; *Asplenium adiantum nigrum*; *Pteris caudata*; *Adiantum Capillus veneris*; *Aspidium rigidum*; *A. Lonchitis*.

RODRIGUEZIA. Six species. Stove orchids. Division. Peat and wood.

ROELLIA. Six species. Chiefly green-house evergreen shrubs. *R. decurrens*, a half-hardy annual; *R. mucosa*, an herbaceous perennial. Seed, or young cuttings. Sandy loam and peat.

R. ciliata is a Cape plant, and requires a green-house in this country. It should be potted in light rich soil, such as a mixture of peat, leaf-mould, sand, and loam. Keep it rather dry when it is not growing, but give it plenty of water at other times.

RÆPERA. Two species. Green-house evergreen shrubs. Young cuttings or seeds. Loam, peat, and sand. *R. aurantiaca* will flower in an open border.

ROLANDRA argentea. Green-house evergreen shrub. Cuttings. Loam and peat.

ROLLER. This is best made of cast-iron, and may be had of four different sizes, viz. with a diameter of sixteen, eighteen, twenty-two, or twenty-four inches. The roller and water-engine, where either the lawns or roads are extensive, may be combined advantageously.

RONDELETIA. Eleven species. Stove evergreen shrubs. Cuttings. Loam, peat, and sand.

ROOTS are either annual, biennial, or perennial, but in all roots, and under any mode of management, the fibrous parts (radiculæ) are strictly annual; they decay as winter approaches, and are produced with the returning vigour of their parent in the spring. Hence the reason that plants are transplanted with most success during the season of their decay: for, as the root almost exclusively imbibes nourishment by the mouths of these fibres, in proportion as they are injured by the removal, so is

the plant deprived of the means of support; that sap which is employed in the formation of new fibres, would have served to increase the size of other parts.

The quantity of root I have always observed to increase with the poverty of the soil in which it is growing. A root always proceeds to that direction where food is most abundant; and from a knowledge of this fact, we should be circumspect in our mode of applying manures, according to the crop and object we have in view. The soil in my own garden being shallow, never produced a carrot or a parsnip of any size; but almost every root consisted of numerous forks thickly coated with fibres; digging two spades deep produced no material advantage, the gardener applying as usual manure to the surface; but by trenching as before, and turning in a small quantity of manure at the bottom, the roots always spindled well, grew clean, and had few lateral fibres. For late crops of peas, which mildew, chiefly from a deficiency of moisture to the root, it is an object to keep their radicle near the surface, for the sake of the light depositions of moisture incident to their season of growth; hence it will always be found of benefit to cover the earth over the rows, with a little well-rotted dung, and to point it in lightly.

If it be desirable to prevent the roots of any plant travelling in a certain direction, the soil on that side should be excavated, and the cavity refilled with sand, or some other unfertile earth, whilst the soil on those sides of the plant whither the roots are desired to tend, should be made as fertile as is permissible with its habits.

It may be accepted as a universal maxim, that whatever causes an excessive development of root, prevents the production of seed; and *vice versâ*, the production of seed, especially in tuberous-rooted plants, reduces the amount of root developed. Thus, frequent transplanting the young plants of the lettuce, brocoli, and cauliflower, causes the production of numerous fibrous roots, and is found effective in preventing the mature plants advancing early to seed.

The early varieties of the potato do not naturally produce seed; but if their tubers are removed as soon as they are

formed, these early varieties blossom and bear seed as freely as the latter kinds, a fact suggesting many experiments in the cultivation of shy-blooming tuberous-rooted flowers. Again, if the blossoms of these later varieties are plucked off as they appear, the weight of tubers produced will be very materially increased.

According to the usual acceptation of the term, the roots of plants do not emit excrements, yet it is quite certain that, in common with all the other parts of a plant, they perspire matters differing in their amount and composition in every species. The earth in contact with the tubers of a potato fully ripe contains mucilage, and has the peculiar odour of the root; that in contact with the roots of peas is also mucilaginous, and smells very strongly of that vegetable; and the freshly upturned soil where cabbages have been growing, always smells offensively.

MM. Sennebier and Caradori found that if roots of the carrot, scorzonera, and radish, are placed in water, some with only their extremities immersed, and others with their entire surfaces plunged in except the extremities, the former imbibe the water rapidly, and the plants continue vegetating, but the others imbibe no perceptible quantity, and speedily wither. It suggests also the reason why the gardener in applying water or manure to trees or shrubs, does so at a distance from their stems.

A good rule, for ascertaining the proper distance for such applications, seems to be to make them beneath the circumference of the head of the tree; for, as M. De Candolle observed, there is usually a relation between that and the length of the roots, so that the rain falling upon the foliage is poured off most abundantly at the distance most desirable for reaching the extremities of the roots.

This explains why the fibrous points of roots are usually annually renewed, and the caudex (or main limb of the root) extended in length; by these means they each year shoot forth into a fresh soil, always changing their direction to where most food is to be obtained. If the extremity of a root is cut off, it ceases to increase in length, but enlarges its circle of extension by lateral shoots.

The roots of plants, unless frozen,

are constantly imbibing nourishment, and even developing parts; for if the roots of trees planted during the winter be examined after an interval of a few weeks, they will be found to have emitted fresh radicles.

The food they imbibe is slowly elaborated in the vessels of the stem and branches, and there deposited. In general, roots have no buds, and are, therefore, incapable of multiplying the plant to which they belong. But it constantly happens in some species, that they have the power of forming what are called adventitious buds; and in such cases, they may be employed for purposes of propagation.

There is no rule by which the power of a plant to generate such buds by its roots can be judged of: experiment is therefore necessary, in all cases, to determine the point. When there is a difficulty in procuring a suitable stock, pieces of the roots of the plant to be multiplied are often taken as a substitute, and they answer the purpose perfectly well; for the circumstance which hinders the growth of pieces of a root into young branches, is merely their want of buds. If a scion is grafted upon a root, that deficiency is supplied, and the difference between the internal organization of a root and a branch is so trifling as to oppose no obstacle to the solid union of the two.

ROOT-PRUNING has been thus considered by Dr. Lindley, in his excellent *Theory of Horticulture*:—

“In the nurseries, it is a universal practice to prune the roots of transplanted trees: in gardens, this is as seldom performed—which is right. If a wounded or bruised root is allowed to remain upon a transplanted tree, it is apt to decay, and this disease may spread to neighbouring parts, which would otherwise be healthy: to remove the wounded parts of roots is, therefore, desirable. But the case is different with healthy roots. We must remember that every healthy and un mutilated root which is removed, is a loss of nutriment to the plant, and that, too, at a time when it is least able to spare it; and there cannot be any advantage in the removal. The nursery practice is probably intended to render the operation of transplanting large numbers of plants less troublesome: and, as it is chiefly applied to seedlings and young plants

with a superabundance of roots, the loss, in their case, is not so much felt. If performed at all, it should take place in the autumn; for, at that time, the root, like the other parts of a plant, are comparatively empty of fluid; but if deferred till the spring, then the roots are all distended with fluid, which has been collecting in them during winter; and every part taken away carries with it a portion of that nurture which the plant had been laying up as the store upon which to commence its renewed growth.

“It must now be obvious that, although root-pruning may be prejudicial in transplanting trees, it may be of the greatest service to such established trees as are too prone to produce branches and leaves, instead of flowers and fruit. In these cases, the excessive vigour is at once stopped, by removal of some of the stronger roots, and consequently, of a part of the superfluous food to which their ‘rankness’ is owing.

“The operation has been successfully performed on the wall trees at Oulton, by Mr. Errington, one of our best English gardeners, and by many others, and, I believe, has never proved an objectionable practice under judicious management. Its effect is, *pro tanto*, to cut off the supply of food, and thus to arrest the rapid growth of the branches.

“Under all ordinary circumstances, the roots must necessarily be injured more or less by removal: in that case, all the larger wounds should be cut to a clean smooth face, and not in long ragged slivers, as is often the case, and which is only substituting one kind of mutilation for another; but at an angle of about 45°, or less.

“If the ends of small roots are bruised, they generally die back a little way, and then emit fresh spongioles; but the larger roots, when bruised, lose the vitality of their broken extremity; their ragged tissue remains open to the uncontrolled introduction of water; decays in consequence of being in contact with an excess of this fluid; and often becomes the seat of disease which spreads to parts that would be healthy.

“When, however, the wound is made clean by a skilful pruner, the vessels all contract, and prevent the introduction of an excess of water into the interior; the wound heals by granu-

lations formed by the living tissue; and the readiness with which this takes place is in proportion to the smallness of the wound. It may be sometimes advantageous to remove large parts of the coarser roots of a tree, even if they are not accidentally wounded when taken up, the object being to compel the plant to throw out, in room of those comparatively inactive subterranean limbs, a supply of young active fibres.

"This is a common practice in the nurseries in transplanting young oaks and other tap-rooted trees, and is one of the means employed by the Lancashire growers of gooseberries, in order to increase the vigour of their branches; in the last case, however, the operation is not confined to the time when transplantation takes place, but is practised annually upon digging the gooseberry borders. The reason why cutting off portions of the principal roots causes a production of fibres appears to be this; the roots are produced by organizable matter sent downwards from the stem; that matter, if uninterrupted, will flow along the main branches of the roots, until it reaches the extremities, adding largely to the wood and horizontal growth of the root, but increasing in a very slight degree the absorbent powers: but if a large limb of the roots is amputated, the powers of the stem remaining the same, all that descending organizable matter which would have been expended in adding to the thickness of the amputated part, is arrested at the time of amputation; and, unable to pass further on, rapidly produces granulations to heal the wound, and immediately afterward young spongioles, which soon establish themselves in the surrounding soil, and become the points of new active fibres."—*Theory of Hort.*

ROPALA. Three species. Green-house evergreen trees. Cuttings. Loam and peat.

ROSE. *Rosa.* Seventy-eight species, and an almost innumerable number of varieties, principally hardy deciduous or evergreen shrubs. To attempt an enumeration, much less a description of all the varieties which they profess to cultivate in Europe, would be an unnecessary waste of space, for the simple reason that many of them are unworthy of preservation,

and others vary so slightly that a practiced eye is scarcely able to detect the difference. The Queen of Flowers had at no previous day attained the celebrity and popular favour it now enjoys, and never was it so well worthy that popularity. Ever charming, it is now doubly so from exhibiting its beauty almost without intermission, whilst very many of them yield powerful and delicious perfume. Those who may be resident in remote positions, and whose idea of the rose, pleasing as it may be, is the recollection of it, as it was in bygone years, are far behind the age—nothing, whether it be artificial, or the product of nature assisted by art, has kept more steady pace with the improvements of our day.

The following select varieties in each of the divisions into which by common consent this flower has been divided, are abstracted from the catalogue of the old Landreth nursery, and though they are now certainly among those most to be desired, who can tell how soon many of them may be superseded by more attractive varieties? Whilst speaking of varieties it may not be out of place to remark that great disappointment has been endured by importers of roses from Europe, induced to order by the enticing descriptions in English and continental works: a large majority, it is believed, have fallen short of their transatlantic character, and American florists have not always escaped censure for distributing varieties of little worth, when their only fault was reliance on the fidelity of European descriptions.

ROSA INDICA.

Bengal, or Daily Rose.

Animated, rosy blush.
 Arsenie, light rose.
 Augustine Hersent, superb rose.
 Assuerus, crimson.
 Admiral Duperre, dark rose.
 Belle Isidore, crimson.
 " de Monza, dark rose.
 " Violet, violet purple.
 Bisson, rosy blush.
 Burette, dark red.
 Cameleon, rose.
 Cramoisi supérieur, crimson.
 Cels, blush.
 Comble de Gloire, crimson.
 Don Carlos, dark rose.

Duchess of Kent, pink.
 Eugene Beauharnais, crimson.
 Fabvier, scarlet.
 Grandral, crimson.
 Grandida, rose.
 Hortensia, light rose.
 Indica Alba, pure white.
 Jacksonia, bright red.
 Louis Philippe, crimson.
 Lady Warrender, white.
 Lawrencia, pink.
 Marjolin, crimson.
 Mrs. Bosanquet, large blush.
 Napoleon, rose fine.
 Reine de Lombardie, cherry red.
 Samson, light rose.
 Triumphant, crimson.
 Vanilla, dark rose.

ROSA INDICA ODORATA.

Tea scented Roses.

Archduchess Theresa, white.
 Aurora, blush.
 Alba, pure white.
 Arkinto, flush colour.
 Adelaide, blush.
 Anthrose, blush white.
 Adam, rosy blush.
 Belle Marguerite, rosy purple.
 Bougère, light rose.
 Boutrand, rosy blush.
 Bon Silène, superb red.
 Bourbon, white.
 Barbot, blush.
 Camellia, white.
 Caroline, bright rose.
 Countess Albemarle, straw colour.
 Duc d'Orleans, bright rose.
 Devoniensis, creamy yellow.
 Devaux, blush.
 Delphine Gaudot, white.
 D'Arrance de Navarre, light pink.
 Eliza Sauvage, pale sulphur.
 Flon, buff.
 Flavescens, yellow.
 Golcondi, blush white.
 Goubault, rosy blush.
 Gigantesque de Lima, light yellow.
 Gloria de Hardi, light rose.
 Hyménée, white.
 Jaune Panaché, straw colour.
 La Sylphide, rosy buff.
 Lilicina, lilac.
 Lyonnais, rose.
 La Pactole, yellow.
 La Renomme, white.
 Madam Desprez, white.
 Mansais, rosy buff.
 Niphotos, white.
 Odoratissima, rich blush.

Princesse Maria, blush.
 " d'Esterhazy, light rose.
 Strombio, white.
 Triomphe de Luxembourg, rosy
 blush.
 Victoria Modeste, blush.
 William Wallace, pale blush.

ROSA BOURBONIANA.

Bourbon Roses.

Augustine Lelieur, bright rose.
 Acidalie, white, large and fine.
 Comte de Rambuteau, violet purple.
 Ceres, dark rose.
 Cytherea, rosy pink, very fragrant.
 Comte d'Eu, bright carmine.
 Doctor Rocques, purple crimson.
 Dumont de Courset, deep purple.
 Du Petit Thouars.
 Emilie Courtier, rosy red.
 Gloire de Rosamene, brilliant crimson.
 " de Paris, bright red.
 Grand Capitaine, brilliant scarlet.
 Gloire de France, rose, *very fragrant*.
 Hermosa, light pink.
 Henri Plantier, pale rose.
 Imperatrice Josephine, creamy white.
 Lady Canning, deep rose.
 Madam Desprez, rosy lilac.
 " Souchet, blush, fine.
 " Lacharme, blush white.
 " Nerard, light rose.
 Maréchal de Villars, rosy purple, fine.
 Ninon de l'Enclos, dark rose.
 Paul Joseph, velvet crimson.
 Princesse Clementine, deep rosy purple.
 Phœnix, rose red.
 Pierre de St. Cyr, light rose.
 Queen, delicate blush.
 Reine de Fontenay, brilliant rose.
 Souchet, deep crimson.
 Souvenir de la Malmaison, creamy
 white, fine.
 Thérésita, bright carmine.

REMONTANT, OR HYBRID PERPETUAL ROSES.

NOTE.—In Europe these roses are highly esteemed; here their reputation as "perpetuals" has been seriously injured, in consequence of their having been in many instances, worked on stocks unsuited either to this rose, or to our climate.

Antinous, dark crimson.
 Aubernon, clear red, very fine.
 Augustine Mouchelet, clear bright
 rose.
 Baronne Provost, fine rose colour.

Comte de Paris, dark crimson.
 Claire du Chatelet, purple red.
 Clementine Syringe, pale rose.
 Comtesse Duchatel.
 Crimson or Rose du Roi, light crimson.
 D'Angers, delicate rose.
 Doctor Marjolin.
 Duc de Aumale.
 Duchesse de Nemours, pale rose.
 " de Sutherland, bright rose.
 Edouard Jesse, dark purple crimson.
 Isaure, bright pink.
 Israel, sable.
 Isigne D'Estotells.
 Josephine Antoinette, rosy blush.
 Louis Bonaparte.
 Lady Fordwich, deep rose.
 " Alice Peel, rosy carmine.
 La Reine, or Queen, rose colour, superb.
 Madame Laffay, brilliant rose.
 Marquise Bocella.
 Mrs. Elliott, rosy red.
 Melanie Cornu, deep crimson.
 Newton.
 Palmyre, blush.
 Princesse Hélène, large deep rose.
 Prince Albert, very dark crimson, fine.
 Prudence Røser, rosy pink.
 Prince de Salm, dark crimson.
 " of Wales, rose carmine.
 Reine de la Guillotière, brilliant crimson.
 Desquermus or Royal, large rose.
 Stanwell, blush very fine.
 Sisley, large bright red.

NOISETTE OR CLUSTER FLOWERING ROSES.

*Those marked * are dwarfs.*

*Alba, creamy white.
 *Aimée Vibert, pure white.
 Bengal Lee, blush, *fragrant*.
 Cadot, blush lilac.
 Charles Tenth, purple.
 Conque de Venus, white rose centre.
 Cœur Jaune, white yellow centre.
 Champneyana, rosy white.
 *Comtesse de Grillion, blush.
 Chromotelle, large yellow fine.
 *Euphrosine, pale yellow.
 Fellenberg, crimson, *superb*.
 *Gabriel, blush, *fine*.
 Jaune Desprez, rosy yellow.
 *Julienne le Sourd, rose.
 Julie de Loynes, white.
 Lamarque, creamy white, *fine*.
 La Biche, flesh colour.
 Lady Byron, pink, *fine*.

Lutea or Smithii, fine yellow.
 Landreth's Carmine, carmine.
 *La Nympe, pale rose.
 Miss Simpson, blush.
 Orloff, pink, *fine*.
 *Ophire, yellow, *fragrant*.
 Sir Walter Scott, deep rose.
 Solfatare, superb dark yellow.
 Vitellina, white.

CLIMBING ROSES.

These flower *annually* in immense clusters, grow rapidly, and are quite hardy.

Banksia lutea, double yellow.
 " alba, white.
 Boursault, rose colour.
 " purpurea, purple.
 " blush, large blush.
 " gracilis, bright rose.
 Bengalis scandens, large rosy white.
 Felicité perpetuelle, blush white.
 Grevillia. Greville produces immense clusters, of various colours and shades, from white to crimson.
 Multiflora, pink.
 " alba, blush white.
 Rubifolia, single Michigan or prairie.
 " elegans, double pink.
 " purpurea, double purple.
 " Queen, double pink.
 " alba, double blush white.
 Russelliana, crimson cottage rose.
 Sempervirens plena, superb white.
 Triomphe de Bollwyler, blush white.
 Laura Davoust, white.

MICROPHYLLA ROSES.

Maria Leonida, white, *extra fine*.
 Microphylla rosea, rose colour.
 " odorata alba, creamy white.

MUSK-SCENTED ROSES.

Moschata, white semi-double.
 " superba, pure white, very double.
 Princesse de Nassau, white double.

HARDY GARDEN ROSES.

Miaulis, rosy purple.
 Coronation, purple crimson.
 Reine des Roses, bright crimson.
 Duc d'Orleans, dark rose.
 Painted damask, white.
 Brennes, dark pink.
 Rivers' Geo. IV., superb crimson.
 Hybride blanche, white.

Heureuse surprise, carmine.
 Ranunculus, purple, compact.
 La capricieuse, purple crimson.
 Royal Provins, superb pink.
 Du Roi, *perpetual*, bright red.
 Harrisonii, yellow Austrian briar.
 Moss single, crimson, *very mossy*.

“ common, rose.

“ Luxembourg, crimson.

“ white, perpetual.

“ crested.

“ Adelaide.

York and Lancaster, red and white.

Provins Belgic, large pink.

Four Seasons, pink.

Moretti, light rose.

Burgundy, rose, compact.

PERSIAN, *this is the finest yellow rose now in cultivation.*

Characteristics of Excellence.—Petals thick, broad, and smooth edged; highly perfumed; outline of flower, circular; outer petals, curving slightly inwards, and imbricated in distinct rows; colour, distinct and permanent; flowers, uniform in size, well above the foliage, and on foot-stalks stiff but elastic; foliage, bright green; habit of the plant, shrubby.

Propagation.—We give the directions for propagation by budding, grafting, cuttings, &c., and the general management of this plant, just as it appears in the English edition of this work. The American florist has greatly simplified much therein described—still it is well to exhibit what is done by others.

By Seed.—Mr. Paul, the eminent florist, recommends the following,—“which,” he says, “seed freely, and appear well suited for female parents. First among the hybrid Chinese are, Athelin and Celine; Ne plus Ultra; Duke of Devonshire; Chatelain; Princess Augusta; Henri Barbet; Globe, White Hip; General Allard, Aurora, and others. These might be crossed with some of the freest blooming damask, perpetual, or Bourbon roses, to endeavour to obtain an increase of, and an improvement among, the hardy autumnal roses. The Ayrshire and Sem-pervirens, among which there is a paucity of high-coloured flowers, might be fertilized with the farina of some dark varieties selected from those sections which approach nearest to them in natural character. Here Ruga Splendens, and Leopoldine d’Orleans, might

form the female parents. Among the moss, the Single Crimson, Du Luxembourg, and Eclatante, occasionally seed. Among the briers, the Double Yellow, and Harrisonii. Among the Bourbons, the old or de Lisle, Augustine Lelieur, Dubourg, Gloire de Rosamène, Emile Courtier, and Bouquet de Flore. Among the Chinese, Camellia Blanc, Fabvier, Thérèse Stravins, Alba, Belle Elvire, Henri Cinque, and Madame Bureau. Among the tea-scented, Odbrate, Jaune Hamon, Lyonnais, Hardy, Lady Granville, Caroline Gonbault, Belle Allemande, and Bardon. Many of the least double Gallica roses also seed freely. As the female parent will, in many cases, be but semi-double, we should endeavour to counteract the probable results of this by crossing with farina gathered from the most double varieties that we can collect it from. The plants intended to seed should be selected in a good state of growth, and never allowed to suffer from drought. When the bloom is in trusses, the backward flower buds should be cut out, leaving not more than six of the plumpest and most perfect buds on one flower-stalk.”—*Gard. Chron.*

Those who wish to raise seedling roses should not gather the hips until they have been exposed to frost, for it is a curious fact that the seeds of those thus subjected to a low temperature germinate with less failures. This is a lesson probably from nature, for it is certain that the hips of the rose never fall or shed their seed to the ground until they have been frosted.

Budding.—Preparing Stocks.—The Boursault and De Lisle roses have been suggested as the best stocks for pot-culture, and if grown in a rich sheltered soil, and cut down for stooling, some of the shoots of the second year may be layered the same season. If the end of the layer is tied carefully to a stick, it will allow a bud to be inserted in a few weeks. The tongue being cut on the layer’s upper side will save the shoot from breaking. Mr. Reid, of Noble Thorpe, near Barnsley, from whom these directions come, recommends a piece of clay or a small stone to be inserted in the opening, to prevent its adhering before roots are formed. About the end of October these early layers will be rooted, and may be potted. Only one bud to be

inserted on a stock. Many varieties, as Bourbon, Noisette, China, Tea-scented, &c., if well managed, will bloom beautifully in the spring and summer following.

Mr. Jos. Baumann recommends the seeds of the dog rose to be sown in February, the seedlings, cut back to two eyes, potted in forty-eights next autumn; plunged in a border until early in July; to be budded at the end of August; headed down in November; potted in thirty-tvos; protected in a frame during winter; started by dung heat in January, and the shoots when three inches long pinched back to one inch, this being repeated two or three times to form a good head. In autumn, prune and shift to larger pots, to remain for some years. These stocks produce very enduring and bright flowers. Rosa Banksia, herberifolia, bracteata, and multiflora, do best on Quatre Saisons stocks.

In budding on the Boursault, and indeed on any other rose, an excellent mode is, in April, to tongue a strong shoot, pass it through a forty-eight pot, until the tongue is in the centre, and then press the pot full of a mixture of rotten dung and sand. It may be budded at the time, but whenever done, the shoot should be headed down at the time of budding to within two eyes of the bud.—*Gard. Chron.*

Mr. Glenny recommends the stocks to be planted in a rich stiffish ground, two feet apart in the row, and three feet between the rows, with a stake every ten feet, and rods of sufficient strength, reaching from one to another, to secure them against the effects of the wind. Plant no deeper than just to cover the crown of the roots. When growing commences rub off, twice a week, all the buds that are not wanted, but let the highest remain, for a stock six feet high often produces no shoots higher than half its height. In the first week of July, the thorns should be removed from those places on the stocks intended for *budding roses*. If they be not taken away, the operation is rendered needlessly troublesome; and it is best done now as time is thus allowed for the bark's healing. The best time for budding the rose is towards the end of July, a dormant eye being employed, just after a fall of rain, and when no strong dry wind is moving. An atten-

tion to these circumstances insures that the sap is flowing freely, and avoids a rapid evaporation, so often preventing success. But budding may be in spring, if the buds are extracted with a small portion of wood adhering to them. For this purpose, scions are cut before winter, and stuck into the ground till the moment when in spring the bark of the stock will run. To prepare the bud, we make firstly, a transverse cut into the wood a little below an eye, which incision is met by a longer cut downwards, commencing at a short distance above the eye, care being taken that a portion of wood is removed with the bark. This bud is inserted into the bark of the stock, which is cut like an inverted T, the horizontal edges of this cut in the stock, and of the bud, must be brought into the most perfect contact with each other, and then bound with waterproof bast, without, however, applying grafting clay. Eight days after the insertion of the bud, the stock is pruned down to the branch, which is immediately above the opposite side, and this branch is stopped by being cut down to two or three eyes; all the side wood is destroyed, and when the bud has pushed its fifth leaf, compel it to branch by pinching its extremity; it will then flower in September of the same year. You may also bud the rose in the spring without waiting till the bark separates, by placing the bud with some wood on it, in a niche made in the stock, similar to what would be formed by taking an eye for budding from it in the manner above described, and into which it is fitted exactly with a slight pressure. It is recommended to make the cut for the niche where there is already a bud on the stock; when placed, the bud is then bound with bast and covered with mastic.—*Gard. Mag.*

Grafting.—"The exact time," says the best treatise on the 'Tree Rose,' "for removing the scions from the parent tree, must depend upon the season; some time during the first three weeks in February is the usual period. There does not exist an actual necessity for cutting the scions until they are required for use; but then it will be more difficult to select the numbers required in a state fit for use, and there is a greater chance of their going off, if the weather remain cold, or the sap be not immediately supplied. Scions cut when the

sap is quite down, carry better and are in every way more hardy. Let the shoot remain for three weeks in an out-house, or any other place, neither very dry nor very damp, where neither wind nor sun can come in contact with them; the clay being damped with a sparing hand, if the generality of the scions appear to shrink. During the first week in March the head of the stock (in which the sap should be beginning to rise) is to be cut off horizontally, a slit made in it straight downwards of a couple of inches, or an inch and a half long, without injuring the sides of the bark. The scion is to be taken in the left hand, three buds, or two if the stock be not large, being left upon it; the lower extremity must then be cut in the shape of a wedge, the back being rather the thinnest, and the lowest bud about half an inch above the thick end of the wedge. In doing which, care must be taken that the bark be undisturbed, and each scion so placed that when entered in the stock, all the buds may point outward, or at any rate be in such position, that the shoots from them may not interfere with each other. The end of a budding knife or a little wooden or ivory wedge may be used to open the slit in the stock on one side, and the scion, with the thickest part or front outwards, must be placed in the other, care being taken that the edge of the inner bark or liber of the scion touches the edges of the inner bark of the stock all the way down; the wedge may then be removed and another scion entered in its place, the slit being kept open by the first: if the size of the scion be only half the size of the stock, a shoulder may be left to the former, and the chances of success thereby increased. Any number of scions may be inserted in the same stock, but from one to four at most are all that are desirable in the present case to cover completely the head of the stock, which is apt to receive much injury from the weather, if not carefully attended to. The object of laying by the scions, is that the stock may be forwardest, and be enabled to supply the sap and force them forward at once, instead of lingering while they perish from exposure and want of nourishment. When the shoots are on, the whole must be tied up with a bast ligature to prevent the scions from shifting, which from their wedge-like shape they

will have a tendency to do, when the rise of the sap swells the stock, thereby diminishing the juxtaposition of their respective libers, and the whole beneath the lowest bud covered with grafting clay, totally excluding air, sun, and rain. If the clay crack, it must be renewed, not by shifting, but by filling up the crack. In about six months the clay may be removed, and the wound covered with grafting wax; this latter on no account must be omitted.”—*Gard. Chron.*

“In Flanders, cleft-grafting is adopted, and care taken that the scion is of the same diameter as the stock, or the cleft in the stock made sufficiently near one side of the cross section, that the bark of the scion may fit the stock on both sides. This mode is adopted in grafting one sort of garden-rose upon another. In grafting upon the dog-rose the same practice is followed, with this addition, that a shoulder is very often made to the scion, so as that it may rest with greater firmness upon the stock; such stocks being often employed as standards, and therefore more exposed to wind.

“Mr. Calvert, of Rouen, observes that it is the general practice to form the wedge in a part of the scion where there are no buds, but that he adopts a contrary practice, and finds that a bud, on the wedge part of the scion, greatly contributes to the success of the graft. By taking care to have a bud on the lower part of the scion, Mr. Calvert has even been successful in grafting roses by the whip or splice method, which, without a bud on the lower part of the scion, very often fails; but, with a bud, fails very seldom.”—*Gard. Mag.*

Cuttings are made to succeed by the following treatment:—

“Take a cutting of a this-year’s shoot, removing all but one leaf, and cutting off the upper part of the shoot above the leaf, and reducing its entire length to six inches. The cutting should be planted on the north side of a wall, under glass in a small frame, on a newly prepared hot-bed, and in a soil of leaf-mould, eight inches deep, well soaked with water, and covered over with sand. Water is to be given, and air abundantly, for the first four days, lessening its admission daily, until rooting is completed, which will be in about

three weeks. In the fourth week the cutting may be potted.”—*Gard. Chron.*

By Suckers.—Roses send up many suckers annually, which may be taken up in autumn, winter, or early spring, with some rootlets attached; and the strongest may be planted out finally, and the weakest in the nursery for a year or two or longer. They will readily grow, and will, most of them, produce flowers the following summer.

When rose-trees have grown into large bunches, with many suckers, the whole may be taken up and slipped, or divided into separate plants. The moss, and some others, furnish suckers but sparingly.

By Layers.—To obtain shoots for layering, a quantity of rose-trees should be planted for stools, which, being headed down low, will throw out shoots abundantly near the ground, in summer, for layering in autumn or winter following. They will be rooted by next autumn, and fit for transplantation in nursery rows; though sometimes the moss-rose and some others require two years before they are tolerably well rooted. But of these sorts you may also try layers of the shoots of the year, layered in summer, any time in June. They will probably root a little the same season. The layers of all the sorts, after being properly rooted, should be taken up in autumn and planted in the nursery, to have one or two years' growth.—*Abercrombie.*

Soil.—All the cultivated roses, and especially the double-flowering kinds, require a rich loamy soil inclining to clay rather than sand; and they require also, like most double flowers, plenty of moisture when in a growing state.

Manures.—The best is a mixture of one part guano, three parts charred turf and earth, and six parts cow-dung. A thin dressing pointed in every spring.

Pruning.—Mr. Glenny gives these very good and full directions:—

“Suppose we have a standard, with only one branch from the bud, which is always stronger and better than if there are two or three—the first season we should cut that to within two eyes of the ground, if a rose on its own root, or within two eyes of the stock, if it be a budded one. These two eyes would, the very first year, send out two blooming branches, which would grow a considerable length. The next season we

should cut both of these into within two eyes of the short branch they started from; and this would make each of those branches start out two more; and unless to get the tree, or the dwarf bush, into any particular form, we should never omit cutting down shoots, and often cut out old lumps of wood and branches to thin the tree, which must never get crowded. By the same rule we should always cut away all the spindly shoots. China roses, and all constant bloomers, which require continued attention, should have only the old wood and the weak shoots cut away, because any violent pruning would throw the plant out of flower for a considerable time; while carefully removing the seed-vessels, and taking away weak wood to make room for the stronger, will keep them constantly flowering. This is especially requisite with climbing roses, where the favourable aspect, and other circumstances, may set the seed of almost every bloom. The swelling of their seed-vessels will take all the nourishment from the shoots that would otherwise continue to grow and bear flowers; and the seed will often complete its growth and ripen before there is anything like a general bloom again.”—*Gard. and Prac. Flor.*

“A very good time for performing the operation is immediately after the bloom is over; cutting out old exhausted wood, shortening shoots which have flowered to a good bud accompanied with a healthy leaf, but leaving such shoots as are still in a growing state untouched till October.

“Where very large roses are wanted, all the buds but that on the extreme point of each shoot should be pinched off as soon as they make their appearance, and the plant liberally supplied with water.

“To lessen evaporation, and keep up a constant moisture at the root of their roses, the Paris gardeners generally mulch them with half-rotten stable dung or partially rotten leaves.”—*Enc. Gard.*

The Banksian Rose must be pruned at no other time, but immediately after it has done blooming in June, or early in July.

Planting.—“On removing trees,” says the author of the *Tree Rose*, “the fresh shoots they have made, and the appearance of those which were left,

will require attention in the application of the knife. In pruning a large root it should be cut to a lateral; in shortening a small one, to a fibre. Where a plant has been examined and trimmed recently, however, the knife should be sparingly used.

"And it may here be well to observe, that all cuts to remove branches, knots, or roots, should be quite clean, slanting (and deep enough to the stem, viz. even with it), and nothing left projecting lest dead wood be the consequence, and the plant be eventually injured. All wounds should be carefully healed, and dead wood should, in all cases, be removed, and living bark encircle that which remains."

The best time for planting is November.

Forcing.—For the following very successful mode of forcing roses, we are indebted to R. A. Salisbury, Esq:—

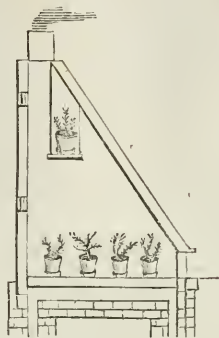
"Take off strong suckers about the end of October or beginning of November, with all the fibres they may have formed, which can only be well done by digging up the parent stock. Plant these suckers in pots only about four inches diameter at the top, winding the sucker three, four, or five times round the inside of the pot; and prune it, so as to leave no more than two buds, or three at most, above ground. Fill the pots with hazel loam, mixed with one-third equal parts charred turf and vegetable mould, pressing it firmly down to keep the sucker from starting, and plunge them to the brim close to one another quincunx fashion, in an open bed fully exposed to the sun and air.

"The small size of these pots makes stronger blossoms, even the first if the suckers are large; and as they are to be shifted annually, it is absolutely necessary to begin with small pots. To have a plentiful supply of blossoms during the months of December, January, February, March, April and May, from one hundred to three hundred suckers must be thus prepared.

"For the plants to be forced, from December to March, a small frame should be devoted, about twelve feet long, five feet wide, seven feet wide behind, and only six or eight inches in front. This pitch admits the rays of light, at that period, to strike upon the plants to the greatest advantage, a flue,

or tank, or pipes, if hot water be used, running from one end to the other. If the floor be built thick, and the fire-

Fig. 149.



place, as well as the chimney-top, be well closed up after the heat has penetrated the flue, the air within will be sufficiently heated with very little fuel, and require no attendance at night, except in very severe frost. The back of this frame may consist of wood, or a narrow brick, at pleasure, and should have a door in the middle, just sufficiently large to admit the gardener to creep in and water the plants, by reaching over them from one side to the other without any walk inside.

"A strong latticed floor must be fixed six inches above the flue, on which the pots must be placed when introduced; and these must have a pan or receiver under each, to prevent the heat of the flue, which will now and then be smart notwithstanding every precaution, from striking directly on the pots themselves. After the month of March, roses may be advantageously forced in other houses and situations, but hardly sooner, except on the front flue of a pine-stove: and a small frame like this is not only built and maintained at a small cost; but the lights may be used for other crops, especially melons, after June.

"The plants to be forced into blossom by Christmas-day should be placed in this frame on the first day of October, lighting fires gradually, so as to keep the temperature, in the daytime, rather increasing than decreasing—from 60° of Fahrenheit to 80°; but at night 35°

is not too low. If the plants meet with one frosty night or two in the beginning of October, so much the better; for they will push more vigorously after the heat is applied. The first year none of the crops will come in so early as afterwards; and I advise all the young suckers to be forced in succession the first year, not waiting till they have had one year's growth in the open air. Moreover, if the suckers are strong, they will produce more blossoms than might be expected. The second crop of plants introduced on the first of November will blossom from the middle of January to mid-February; the third crop, introduced December 1st, from mid-February to the middle of March; those of the fourth crop, introduced on the first of January, from the middle of March to the middle of April; those of the fifth crop, introduced on the first of February, from the middle of April to the middle of May; those of the sixth and last crop, introduced on the first of March, from the middle of May till the middle of June, when several varieties in the open ground begin to blossom.

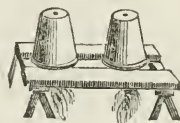
"As soon as the plants begin to push their buds, whether any aphides appear upon the young shoots or not, fill the frame with tobacco-smoke; and do not fail to repeat this every third week till the flowers appear; smoking, for the last time, just before any red tints appear on the earliest buds. No unpleasant smell of the tobacco will remain upon the plants after a day or two. The young shoots must also be carefully examined when half an inch long, and any grubs feeding upon them destroyed.

"After the blossoms are gathered the plants must not be removed to a back shed, but kept in the frame, or brought back into it, if they have been taken into the apartments of the owner, permitting them to grow as they do in summer, in the open air, for at least two or three months. They must then be placed in a shady situation, and kept rather dry than moist, to throw them into a state of rest.

"After the month of May, Mr. Salisbury prefers inverting them, especially the earlier crops, between two planks raised upon tressels, high enough to prevent the branches from touching the earth, as in the annexed sketch, having

for twenty-five years experienced the utility of this treatment, and suspecting that it strengthens the future blossoms by retaining sap in the branches, which would otherwise descend to the root or form suckers.

Fig. 150.



"While the plants are growing they must be constantly supplied with moisture — water and guano, or pigeons' dung infused in it a few days before, in the proportion of one ounce of the former, and of the latter one ounce to a gallon of water. Where pigeons' dung cannot be had, two ounces of sheep or deer's dung may be substituted to each gallon of water.

"It now only remains to add, that it is most important in forcing roses to mark all the plants, so that those introduced into the frame in October, the first year, may be introduced on the same day, the second and every succeeding year. To secure this, paint No. 1, 2, 3, &c., upon the pots themselves, No. 1 to go in first, and so on.

"Every year, about a fortnight before the plants are forced, they must be shifted into larger pots, exactly one inch wider in diameter, and not more, turning them out without breaking the ball or disturbing any of the fibres, and filling the pots with the same compost of hazel loam, charred turf, and vegetable earth. By this method the same plants may be forced for ten years, without the inconvenience of using a very large pot, as the last season they will not want to be removed, or may be shifted into the same pot again.

"With respect to pruning, I have never been in the habit of leaving more than two buds on each branch, and, as the plants increase in size and number of branches, often only one bud upon the weaker branches. It is much better to have from ten to twenty strong blossoms than a larger number of weak ones, and the foliage is likewise more healthy."—*Gard. Mag.*

Pot-Culture has been more fully dis-

cussed by Messrs. Paul and Son, the florists of Cheshunt, than by any other authority; and from their observations I have made these extracts:—

“Transplanting and Potting.”—Early in autumn, immediately after rain, remove both worked plants and others from the ground. Such as have grown moderately, with well ripened wood, should be chosen. The pots best suited are numbers thirty-two, twenty-four, sixteen and twelve, according to the size of the plant, and they should be well drained. The soil should be pressed firmly in the pots, watering freely afterwards, through a fine rose, to settle the soil.

“The cultivation of the autumnals, on their own roots, may be commenced at any season, as they are usually kept growing in pots. If purchased in spring, in sixties, they may be immediately shifted into forty-eights, then plunged, and watered continually as required. Our aim being to get the plants strong, they should not be suffered to flower, but endeavour, through the growing season, to bring them to form only a few vigorous shoots. To accomplish this it is advisable to rub out some of the buds when first pushing, but keeping in view the handsome formation of the plant.

“The plants may be shifted on through the season; and in the following spring we shall probably find them in sixteen or twelve-sized pots, preparing for a vigorous growth and bloom.

“Thinning out.”—When potting, all suckers should be cut from the worked plants, and straggling shoots shortened back to within a few eyes. Where too thick, some of the shoots may be cut out entirely, from three to ten, according to the age or growth of the plant, being in most cases sufficient. Thinning, in summer, immediately after flowering, is very beneficial. The best ripened shoots should be left, and such as stand in the best position. These may be shortened in November and March, some at both periods, to obtain an early and late bloom.

“Soil.”—Two parts of fresh turfy loam, broken up but not sifted, two parts manure (road gatherings laid by for a season, or the remains of a hot-bed not too far decomposed), and one part burnt earth.

“This compost should be thrown up in a heap in autumn, and turned two or

three times during winter, and a little newly slaked lime scattered throughout to destroy worms and grubs. This is the soil used for the moss, but for the delicate varieties, (Chinese, &c.) it may be improved by the addition of one part leaf-mould or well pulverized manure.”

Protection.—After potting, the plants taken from the ground, should be removed to a cold pit, syringing and shading if sunny weather, for a week or ten days. It will be well if the tender varieties can be allowed to remain in the pit during winter, at which season they require scarcely any water, otherwise they should be removed to the north side of a wall or fence, and a thatch of fern or beech boughs, with the leaves on, formed. The hardy ones may be removed from the pits about a month after being potted, and plunged at once in the open ground where intended to be grown and flowered.

Pruning.—About the middle of November pruning may be performed, in order to effect an early bloom. The plants having been thinned out previously, all that is now required, is the shortening in of the remaining shoots.

Among the hybrid Chinese, the two favourite old roses, Brennus and Fulgens, both vigorous growers, frequently occasion great disappointment by not blooming. The failure will probably be found to arise from the method of pruning.

These roses, and others of like habit, should be well thinned out, but the shoots that are left for flowering shortened but little. Others of the same class (hybrid Chinese), that are weak growers, may be shortened in close, such as General Allard and Lady Stuart.

There are also varieties of intermediate growth, which may be pruned in proportion. The classes Gallica, Provence, and Moss, may be pruned closer than the hybrid Chinese.

The autumnal roses there is but little fear of pruning out of bloom; early or late, they are sure to flower. These, when grown on their own roots, should be cut down almost close to the ground, to induce them to throw up suckers from beneath, which will grow much stronger than shoots formed above ground, and flower beautifully through the summer and autumn. One point too should be borne in mind, that roses, when grown in pots, may be pruned

closer than when grown in the open garden.

Removal of Tender Varieties.—By the end of March, if room cannot be granted them in pits or a green-house, the tender varieties may be brought from their winter residence and plunged in an airy situation, and such as were left unpruned for late flowering, should now be pruned. But if allowed to remain in the pits through spring, they will bloom much earlier, in greater perfection, and with finer foliage.

Plunging.—Place the pots so that the bottoms rest on an inverted seed-pan or flower-pot. This secures drainage, prevents the roots growing through the bottom of the pot into the soil, and is an effectual barrier to the ingress of worms. The pots may be plunged level with the ground, and so far apart that the plants may not touch each other when full grown. After plunging, it is beneficial to cover the surface lightly with stable manure.

Watering.—Water should be given abundantly through the growing and blooming season. Guano-water is an excellent manure for roses in pots; it should, however, be used cautiously. If the plants require watering oftener than once a week, pure water should be given at the intervening periods.

Disbudding, &c.—When the buds first push, if two or three break close together, the weakest, or those taking the least favourable direction, should be rubbed out. Such shoots as are inclined to grow rank without blooming, should be stopped or taken out, if not wanted to form the head, for they appropriate to themselves the sap, which should be directed into the flower branches, and further render the plants of uneven growth. When the flower-buds are forming imperfectly, they should be nipped out; and the size of the early flowers may be increased by removing, at an early stage, the small backward flower-buds.

Suckers from the stock should be invariably cut out. It will also be found beneficial to keep the surface of the soil constantly in a loose state.

Tying-up and Training.—As the plants advance in growth, some will require sticks to support the flowers, and keep the shoots apart. But those which hold their flowers gracefully and show themselves well are not, perhaps,

improved by being drawn from their natural position of growth. Where the flowers do not show themselves to advantage, or the shoots become much crowded, the dwarf standards may be improved in appearance, and really benefited, by drawing the lower shoots downwards towards the edge of the pot, where they may be fastened to a piece of bast or wire made to pass beneath the rim; the upper shoots may then be drawn out to sticks; or a neat hoop, fixed horizontally about the centre of the head of the plant, admits of a very pretty method of arrangement. If the plant be large, two or even three hoops may be requisite, to which the shoots should be drawn inclined downwards; as they are, when growing, sure to rise sufficiently upwards.

Shading.—When the plants commence flowering, it will be necessary to shade them during the middle of the day; and the covering should be movable, that they may have the advantage of slight rains and dews.—*Gard. and Prac. Flor.*

Diseases. See *Extravasated Sap, Cygnips, Mildew, Aphis, and Ornix.*

ROSCOEIA. Five species. Stove herbaceous perennials. Division. Light turfy loam.

ROSE. See *Rosa*.

ROSE ACACIA. *Robinia hispida*.

ROSE BAY. *Epilobium angustifolium*.

ROSE BEETLE. See *Anisopia*.

ROSEMARY. *Rosmarinus officinalis*.

Varieties.—There are three varieties—the green, golden-striped, and silver-striped. The first is in general cultivation.

Soil and Situation.—It thrives best on a poor light soil mixed with old mortar, or other calcareous matters. In such, or when the plants are self-raised on an old wall, they will bear our severest winters; but in a rich soil they lose much of their aromatic nature, and perish in frost. For the green variety, the situation may be open, but the other two being tender, require to be planted beneath a south wall, or in pots to be allowed the shelter of a green-house in winter.

Propagation is by cuttings and rooted slips, during any of the spring months, or by layers in the summer. But the finest plants are raised by seed, which,

and by layers, is the only mode of propagating the gold and silver-striped varieties. Sow in March or early in April, in drills one inch deep and six inches apart. The rooted slips, and the cuttings of the young shoots, must be from five to seven inches long, and planted in a shady border, in rows eight or ten inches apart. Previously to being inserted, remove the leaves from the lower two-thirds of their length. Layers may be formed by cutting young branches half through on their under side, and pegging them down an inch or two below the surface; they become established plants by autumn. Water must be applied abundantly at the time of planting, and occasionally afterwards until established.

The plants require no further care than to be kept clear from weeds, and in September to be transplanted to remain, being performed, in preference, during mild showery weather; but if not removed thus early in the autumn, they are best left until the following March. They may be either grown in rows two feet apart each way, or trained in a fan form against a wall.

ROSE OF HEAVEN. *Lychnis Cæli-Rosa*.

ROSE OF JERICHO. *Anastatica*.

ROSE OF THE WORLD. *Camellia japonica Rosa-mundi*.

ROSE SNOWBALL TREE. *Fiburnum Opulus roseum*.

ROSMARINUS *officinalis*. See *Rosemary*.

ROTATION IN CROPS. There are three circumstances to be regarded in regulating the order in which crops should follow each other:—1. Each crop should be as dissimilar as possible from its predecessor. 2. The exuvæ of the preceding crop should not be offensive to its successor. 3. A fusiform-rooted crop should succeed a fibrous-rooted crop, or *vice versa*.

1. Dissimilarity in the following crop is desirable, because, so far as the saline constituents of the soil are concerned, every tribe of plants in some measure takes from it distinct food. Sir H. Davy truly observed upon this point, that, “though the general composition of plants is very analogous, yet the specific differences in the products of many of them, and other well ascertained facts, prove that they must

derive different materials from the soil; and though the vegetables having the smallest systems of leaves, will proportionately most exhaust the soil of common nutritive matter, yet particular vegetables, when their produce is carried off, will require peculiar principles to be supplied to the land in which they grow. Strawberries and potatoes at first produce luxuriantly in virgin mould recently turned up from pasture, but in a few years they degenerate and require a fresh soil; and the organization of these plants is such as to be constantly producing the migration of their layers. Thus the strawberry by its long shoots is continually endeavouring to occupy a new soil; and the fibrous radicles of the potato produce bulbs at a considerable distance from the parent plant. The most remarkable instance of the powers of the plant to exhaust the soil of certain principles necessary to its growth, is found in certain fungi. Mushrooms are said never to rise in two successive seasons on the same spot; and the production of the phenomena called fairy-rings, has been ascribed by Dr. Wollaston, to the power of the peculiar fungus which forms it to exhaust the soil of the nutriment necessary for the growth of the species. The consequence is that the ring annually extends, for no seeds will grow where their parents grew before them, and the interior part of the circle has been exhausted by preceding crops; but where the fungus has died, nourishment is supplied for grass which usually rises within the circle, coarse and of a dark green colour.”

Again, exhausting crops should never be grown successively; and the following observations of one of the best of modern gardeners, the late Mr. G. Sinclair, afford much light upon this point:—

“If we take the weight of nutritive matter which a plant affords from a given space of ground, the result will be found to agree with the daily experience in the garden and the farm; and the following figures represent the proportion in which they stand to each other with respect to the weight of nutritive matter they contain, with their having exhausted the land:—

“Potatoes	63
Cabbage	42
Mangold wurzel	21

Carrots	24
Kohl-rabi	17
Swedish turnip	16
Common turnip	14

2. It is important that the exuvæ of a preceding crop should not be offensive to its successor.

Thus, brassicas will not grow healthily upon soil where the immediately previous crop was of the same tribe; but if the ground be pared and burnt, they will grow luxuriantly; and the same occurs to ground exhausted by strawberries: if it be burned and manured, strawberries will grow as vigorously as upon fresh ground, but they will not do so if manure only is applied.

It has also been observed that the roots of plants placed in water give out their characteristic flavours to the liquid; but on this, as evidence that they emit excrements, no great reliance can be placed, for some of the roots, during removal from the soil, must be wounded. The fact that the roots of plants do give out peculiar and varying matters to the soil which sustains them, aids to explain why one rotation of crops is superior to another.

3. As fusiform-rooted crops should precede or follow a fibrous-rooted crop, because the one draws its chief supply of food from a greater depth than another, and, consequently, exhausts a different portion of pasturage; founded upon these considerations, and sanctioned by practice, the following rotations are recommended:—

Onions.	Turnips.
Lettuce.	Celery.
Cabbage.	Peas.
Carrots.	Potatoes.
Manure.	Manure.

Mr. Kelly, of Airthrey Castle, Scotland, says, that “on poor ground the rotation he finds best is celery; second season, cauliflowers and red beet; third, onions; fourth, German green, or peas. By digging deep, and manuring abundantly, for celery, the ground is brought into such fine tilth, that the whole rotation is often gone through without any further addition, and without failing in any of the crops. Another good rotation is strawberries, celery, cauliflowers.”—*Gard. Chron.*

Mr. Errington, gardener at Oulton Park, Cheshire, recommends the following as good successions:—

“Brassicas after raspberries or strawberries; peas after brassicas; celery after peas; celery after asparagus; beans and brocoli after celery; carrots or parsnips or beet after brocoli.”—*Gard. Mag.*

The writer of the Kitchen Garden Calender in the *Gardener's Chronicle* for 1844, (p. 72,) says, “the chief rule is never to have two crops of the same class directly following each other.” He adds, that “celery is a good preparation for carrots, turnips, parsnips, onions, and early cauliflowers, or for peas, with potatoes and winter greens or brocoli between the rows. Autumn-sown onions, followed by spinach, lettuce, &c., and early cauliflowers by autumn onions. Spring-sown onions are well succeeded by cabbages in beds, and scarlet runners between; and if the cabbages remain through the summer and next winter, the ground will be for celery, potatoes, and peas in the spring.” In gardens of limited extent it is not always practicable to observe a systematic rotation of crops, even though it were as important to successful culture as some writers declare. For all practical purposes deep tillage will suffice, and there can be little doubt that if the land be deeply dug or ploughed after each crop, and the exhaustion supplied by manure, that the same description of vegetable growth may be successfully produced for successive seasons—indeed the only inmate of the garden which we have seen tire the land, as it is termed, is the pea. Some market gardeners, whether from habit, or an idea that particular localities answer better for certain vegetables, invariably use them for such, and year after year the same crop may be seen growing thereon.

ROTHIA trifoliata. Hardy trailing annual. Seeds. Common soil, and a warm situation.

ROXBURGHIA. Two species. Stove evergreen climbers. Suckers. Light turfy loam.

ROYAL BAY. *Laurus nobilis.*

ROYENA. Eleven species. Green-house evergreen shrubs. Ripe cuttings. Loam, peat, and sand.

ROYLEA elegans. Green-house evergreen shrub. Cuttings. Light rich soil.

RUBIA. Five species. Hardy herb-

aceous perennials, and half-hardy evergreen shrubs. Seeds or division. Common soil.

RUBUS. [Bramble.] Seventy-three species, and some varieties. Hardy deciduous trailers and shrubs, and a few green-house and stove evergreens, as well as herbaceous perennials. *Rubus Idæus* is the Raspberry. Suckers or cuttings. Rich loam.

RUDBECKIA. Thirteen species, chiefly hardy herbaceous perennials. *R. amplexifolia* is a hardy annual. *R. radula*, a biennial. Division, seeds, and common soil. *R. napifolia* is a green-house perennial, succeeding best in peat and loam.

RUDOLPHIA. Two species. Stove evergreen climbers. Suckers. Light turfy loam.

RUE, or HERB GRACE. *Ruta graveolens*. Thrives best in a poor clayey loam, mixed with calcareous rubbish, in an open situation. It is propagated by slips and cuttings, as well as from seeds; the first two modes being usually practised as being the most easy. It may be planted or sown at any time during the spring. The seed in drills six inches apart, and one deep. The seedlings are not long in making their appearance, and only require to be thinned to a similar distance in the rows, and kept free of weeds. The rooted slips, or cuttings, may be planted on a poor, shady border, and watered occasionally until taken root.

In the autumn, the plants may be removed to their final compartment. During their after-growth, they must be kept pruned in a shrubby form, and never be allowed to produce seed. The decayed branches, &c., may be removed in the spring and autumn, and the surface of the bed stirred.

RUINS, are a class of buildings beautiful as objects, expressive as characters, and peculiarly calculated to connect with their appendages into elegant groups: they may be accommodated with ease to irregularity of ground, and their disorder is improved by it; they may be intimately blended with trees and with thickets, and the interruption is an advantage; for imperfection and obscurity are their properties; and to carry the imagination to something greater than is seen, their effect.

They may for any of these purposes

be separated into detached pieces; contiguity is not necessary nor even the appearance of it, if the relation be preserved, but straggling ruins have a bad effect, when the several parts are equally considerable.

There should be one large mass, to raise an idea of greatness, to attract the others about it, and to be a common centre of union to all; the smaller pieces then mark the original dimensions of one extensive structure; and no longer appear to be the remains of several little buildings.

All remains excite an inquiry into the former state of the edifice, and fix the mind in a contemplation on the use it was applied to; besides the characters expressed by their style and position, they suggest ideas which would not arise from the buildings, if entire.

The purposes of many have ceased; an abbey, or a castle, if complete, can now be no more than a dwelling; the memory of the times, and of the manners to which they were adapted, is preserved only in history and in ruins; and certain sensations of regret, of veneration, or compassion, attend the recollection; nor are these confined to the remains of buildings which are now in disuse; those of an old mansion raise reflections on the domestic comforts once enjoyed, and the ancient hospitality which reigned there. Whatever building we see in decay, we naturally contrast its present to its former state, and delight to ruminate on the comparison. It is true that such effects properly belong to real ruins; but they are produced in a certain degree by those which are fictitious; the impressions are not so strong, but they are exactly similar; and the representation, though it does not present facts to the memory, yet suggests subjects to the imagination; but in order to affect the fancy, the supposed original design should be clear, the use obvious, and the form easy to trace; no fragments should be hazarded without a precise meaning, and an evident connexion; none should be perplexed in their construction or uncertain as to their application. Conjectures about the form, raise doubts about the existence of the ancient structure; the mind must not be allowed to hesitate; it must be hurried away from examining into the reality by the exactness and

the force of the resemblance.—*Wheatley*.

RUIZIA. Two species. Stove evergreen shrubs. Cuttings. Loam, peat and sand.

RUN. A plant advancing to seed is said by gardeners to have "run." Also, when the dark colouring of a carnation, or other flower, becomes confused or clouded with its lighter ground colour, they say it is "a run flower." Abundance of moisture and a rich soil promote the development of leaves, and, consequently, check running, or producing seed. A suitably fertile soil also preserves the colours of a flower pure and distinct—over-fertility or poverty of soil will equally cause the colours to run.

RUNNERS are young shoots issuing from the collar or summit of the root, and creeping along the surface of the soil, but producing a new root and leaves at the extremity, and forming a new individual, by the decay of the connecting link. This takes place in a great variety of herbs, but particularly the strawberry, which is a good example.

They afford very ready and unfailing means of increasing the species or variety, all the care required being to see that the plantlet is well rooted before the connecting string is divided.

RUSCUS. Butcher's Broom. Five species. Chiefly hardy evergreen shrubs. Suckers. Common soil. *R. androgynus* is a green-house evergreen climber. Division. Rich soil.

RUSSELIA. Four species. Stove evergreen shrubs. Cuttings. Light rich soil.

RUST. A disease of the berries of the grape. It appears in the form of a rough, rusty appearance of their skins, which have, in fact, become thick and indurated. Some think it arises from their being handled, or the hair of the head touching them; but the disease is often too general to admit of this topical explanation. I believe it to arise from an over-heating of the vinery, however unintentional, whilst the grapes were young, and thus tending to force them to a premature rapidity of growth. Any excessive pressure upon the cuticle, whether from within or from without, causes its thickening.

RUSTIC STRUCTURES are pleasing in reclusive portions of the pleasure ground, if this style be confined to the formation of either a seat, or a cottage;

but it is ridiculous and disgusting to good taste, if complicated and elegant forms are constructed of rude materials. Thus we have seen a flower-box, intended to be Etruscan in its outlines, formed of split hazel stakes—a combination of the rude and the refined, giving rise to separate trains of ideas totally unassociable.

RUta. Two species. Hardy and half-hardy evergreen shrubs. Cuttings. Light rich soil. See *Rue*.

RUYSCHIA *clusiaefolia*. Stove evergreen shrub. Ripe cuttings. Loam and vegetable mould.

RYANEA *speciosa*. Stove evergreen shrub. Ripe cuttings. Peat and loam.

RYTIDOPHYLLUM *auriculatum*. Stove evergreen shrub. Cuttings. Peat and loam.

SABAL. Five species. Stove palms. Suckers. Light loamy soil.

SABBATIA. Five species. Hardy biennials, except *S. paniculata*, an herbaceous perennial. Seeds. Common soil.

SACCOLABIUM. Ten species. Stove orchids. Peat, potsherds, and wood.

SACRED BEAN. *Nelumbium*.

SAFFRON. *Crocus sativus*.

SAGE. *Salvia officinalis*.

Varieties.—The Common Green; Wormwood; Green, with variegated leaves; Red, with variegated leaves; Painted or Parti-coloured: Spanish or Lavender leaved; and Red.

Soil and Situation.—A dry moderately fertile soil is best suited to their growth, in a sheltered situation.

Propagation.—By *Cuttings*.—These may be either of the preceding or same year's growth; if of the first, plant in April, but if of the latter, not until the close of May or middle of June. The shoots of the same year are usually employed, as they more readily emit roots, and assume a free growth. The outward and most robust shoots should be chosen, and cut from five to seven inches in length. All but the top leaves being removed, insert by the dibble almost down to these, in rows six inches apart each way, in a shady border, and during moist weather, otherwise water must be given immediately, and repeated occasionally, until they have taken root. When the plants thus raised have an appearance of spind-

ling, or run up to flower, they are to be topped to induce laterals. In the autumn, if they have attained a tolerably shrubby growth, otherwise not until the succeeding spring, remove to their final stations; being taken up with as little injury as possible to the roots, and planted, if in a bed in rows two feet apart each way.

By Slips.—When there are rooted slips, they may be taken off separately, with their fibrous roots still pertaining, or the whole plant may be taken up and divided into as many separate slips as can be furnished with roots. These may be planted both in spring and autumn, but the first season is to be preferred. Set out at once where they are to remain.

By Seed is the most preferable mode, the plants affording finer flavoured, larger and greater abundance of leaves, than those raised by other modes. Sow in April, in a bed of rich light earth, in drills half an inch deep, and six inches apart. The plants soon make their appearance, and when two or three inches high, thin to half a foot apart, and those removed prick out at a similar distance. In the autumn or succeeding spring, as the plants are strong or weak, remove them to their final stations.

After-Culture.—During their future existence, keep constantly clear of weeds. The decayed flower-stalks, stunted branches, &c., remove in early winter and spring, and the soil of the beds slightly turn over. All irregular growth may be corrected during the spring and summer. When the plants have continued two or three years, a little dry, well putrefied dung may be turned in during early spring with considerable advantage. A due attention to the mode of gathering has no small influence in keeping the plants healthy and vigorous. The tops ought never to be cropped too close, so as to render the branches naked or stumpy. This should be especially attended to in autumn and winter. During this last season, they are less liable to be injured by severe frost, if kept with a full regular head. If appearance is considered, fresh plants must be raised every three or four years. For drying, the shoots and leaves may be gathered any time in summer before the plants flower, which they do in July.

To obtain Seed.—Two or three of the

finest plants of two years' growth must be left, not nearer to each other than four feet, and when the plants begin to flower, a plentiful watering given, and repeated every other day until the seed has attained its full growth. When perfectly ripe, the plants being pulled up, and completely dried, they easily shed their seed if struck on the floor.

SAGITTARIA. Fifteen species. Hardy, half-hardy, stove and greenhouse aquatic perennials. Division. Loamy soil.

SAGUS. Four species. Stove palms. Sandy loam and a strong moist heat.

ST. ANDREW'S CROSS. *Ascyrum Cruz Andreae*.

ST. BARNABY'S THISTLE. *Centaurea solstitialis*.

SAINTFOIN. *Onobrychis*.

ST. JOHN'S WORT. *Hypericum*.

ST. MARTIN'S FLOWER. *Alstræmeria Flos-Martini*.

ST. PETER'S WORT. *Hypericum Ascyron*.

SALADING. See the following:

American Cress.	Horse Radish.
Beet Root.	Lettuce.
Borage.	Mint.
Burnet.	Mustard.
Celeriac.	Onions.
Celery.	Purslane.
Chervil.	Radishes.
Corn Salad.	Rape.
Cress.	Scurvy Grass.
Dandelion.	Succory.
Endive.	Water Cress.
Finochio.	Wood Sorrel.
Garden Rocket.	

SALICORNIA. Six species. Hardy and greenhouse evergreen shrubs and creepers. Hardy annuals and half-hardy perennials. Seeds or division. Common soil.

SALISBURIA *adiantifolia*. Maiden Hair Tree. Hardy deciduous tree. Layers. Common soil. "The Salisburia is a native of Japan and China, and forms a large tree in its native country. Bunge, who accompanied the Russian mission to China, states, that he saw one with a trunk nearly forty feet in circumference. Mr. Loudon says, the tree grows with considerable rapidity in the climate of London, and has attained the height of forty or fifty feet, in as many years. The longevity of the Salisburia promises to be great, as the largest trees in England continue to grow with as much vigour, as when

newly planted. The highest tree there, planted in 1767, was, in 1838, above sixty feet.

"It was introduced into the United States, by Mr. Hamilton, in 1784, and the tree now growing at the Woodlands, near Philadelphia, is, doubtless, the one then imported. A specimen at the Landreth Nurseries, when planted is unknown, has attained the height of 50 feet and continues in fine health. There is also one of considerable size in the Mall, at Boston."—*Comp. Florist.*

SALIX. The Willow. One hundred and eighty-five species. Hardy deciduous shrubs and trees. Cuttings. Swampy soil.

SALMEA. Two species. Stove evergreen twiners. Young cuttings. Light rich soil.

SALPIGLOSSIS *sinuata*, and its varieties. Hardy and green-house annuals and biennials. Seeds. Peat and loam.

SALSAFY. *Tragopogon porrifolius*.

Soil.—This should be light and moderately fertile. At the time of sowing trench it, turning in a little manure with the bottom spit only.

Sow in March and April, in an open situation to remain, in shallow drills, nine inches asunder, scatter the seeds thinly, and cover them half an inch deep. When the plants are up two or three inches high, thin and weed them, leaving them ten inches asunder, repeating the weeding as may be required during the summer and during very dry weather, watering occasionally very plentifully, and if half an ounce of guano is added to each gallon of water it will be very beneficial. This is all the culture they require. They will have large roots by September or October; when you may begin taking them up for use; and in November, when the leaves begin to decay, a quantity may be preserved in sand for use in time of severe frost; but those left in the ground will not be injured. In spring, when those remaining in the ground begin to vegetate, the shoots when a few inches high may be cut for use as asparagus, being excellent when quite young and tender. Suffer, however, always a few plants to run up to stalk every spring to produce seed.

The best mode of cooking the roots is to boil and mash them, form them into cakes and fry them in butter. The

flavour is that of oyster patties.—*Abercrombie. Hovey's Mag.*

SALTPETRE. See **SALTS**,—*Nitrate of Potash.*

SALTS. The day has long passed when it was disputed whether any saline bodies are promotive of the growth of plants. It is now determined that some plants will not even live without the means of procuring certain salts. Borage, the nettle, and parietaria will not exist except where nitrate of potash is in the soil; turnips, lucerne, and some other plants will not succeed where there is no sulphate of lime. These are facts that have silenced disputation. Still there are found persons who maintain that salts are not essential parts of a plant's structure; they assert that such bodies are beneficial to a plant by absorbing moisture to the vicinity of its roots, or by improving the staple of the soil, or by some other secondary mode. This, however, is refuted by the fact that salts enter as intimately into the constitution of plants as do phosphate of lime into that of bones, and carbonate of lime into that of egg-shells. They are part of their very fabric, universally present, unremovable by edulcoration however long continued, remaining after the longest washing, and always to be found in the ashes of all and of any of their parts, when subjected to incineration. Thus Saussure observes that the phosphate of lime is *universally* present in plants.—*Sur la Veget. c. S. s. 4.*

The sap of all trees contains acetate of potash; *Beet-root* contains malate and oxalate of potash, ammonia and lime; *Rhubarb*, oxalate of potash and lime; *Horse-radish*, sulphur; *Asparagus*, super-malates, chlorides, acetates, and phosphates of potash and lime; *Potatoes*, magnesia, citrates and phosphates of potash and lime; *Jerusalem Artichoke*, citrate, malate, sulphate, chloride, and phosphate of potash; *Garlic*, sulphate of potash, magnesia, and phosphate of lime; *Geraniums*, tartrate of lime, phosphates of lime and magnesia; *Peas*, phosphate of lime; *Kidney Beans*, phosphate of lime and potash; *Oranges*, carbonate, sulphate, and muriate of potash; *Apples* and *Pears*, malate of potash; *Grapes*, tartrate of lime; *Capsicums*, citrate, muriate, and phosphate of potash; *Oak*, carbonate of potash; and the *Lilac*,

nitrate of potash. Let no one fancy that the salts are a very trivial proportion of the fabric of plants. In the Capsicum, they constitute one-tenth of its fruit; of carrot juice, one-hundredth; of Rhubarb, one-eleventh; of Potatoes, one-twentieth; whilst of the seed of the *Lithospermum officinale*, they actually constitute more than one-half. Their constituents are as follows.—

Carbonate of lime . . .	43.7
Silica	16.5
Vegetable matter, phosphate of lime, &c. . . }	39.8

These amounts are nearly as much of earthy saline matters as exist in human bones; but if we turn to the marrow, it only contains one-twentieth of saline matters; the blood only one-hundredth; muscle, only one-thirty-fourth; yet no one will argue that these saline constituents, though smaller than those in vegetables, are trivial and unimportant.

Saline manures are generally beneficial, and often essential. An important consideration, therefore, is contained in the answer to the query—so often put. How should saline manures be applied? Our answer is, that, when practicable, they ought to be in very small quantities and frequently, during the time of the plant's growth. No plan can be worse than soaking seed in a saline solution, for the purpose of giving such salt to the plant of which it will be the parent. It is saddening the embryo with a superfluity totally useless to it, and if it does not injure the germination, it will be most probably washed away before the roots begin to absorb such nutriment. For the mode in which salts are beneficial to plants, see *Manures*.

Common Salt.—Chloride of sodium, applied in the spring at the rate of twenty bushels per acre, has been found very beneficial to asparagus, broad beans, lettuces, onions, carrots, parsneps, potatoes, and beets. Indeed its properties are so generally useful, not only as promoting fertility, but as destroying slugs, &c., that it is a good plan to sow the whole garden every March with this manure, at the rate above specified. The flower garden is included in this recommendation; for some of the best practical gardeners recommend it for the stock, hyacinth, amaryllis, ixia, anemone, colchicum,

narcissus, ranunculus, &c.; and in the fruit garden it has been found beneficial to almost every one of its tenants, especially the cherry and apple. On lawns and walks it helps to drive away worms, and to destroy moss.

Ammonia.—The salts of ammonia are highly stimulating, and afford by their ready decomposition, abundant food to plants. The dungs of animals are fertilizing exactly in proportion to the amount of ammonia in them. The only care required is not to apply them too abundantly. Half an ounce to each gallon of water, given at the most twice a week, is a good recipe for all the ammoniacal salts. The ammoniacal gas liquor at the rate of one pint to two gallons of water, is highly beneficial to spinach and grass.—*Gard. Chron.*

Phosphate of Ammonia has been applied with advantage to cress.

Sulphate of Ammonia.—This, and the nitrate of ammonia, have proved beneficial to potatoes in Scotland. A writer in the *Floricultural Cabinet* says, that having obtained a pailful of gas liquor, he diluted it with water, and added some sulphuric acid, thus forming a solution of sulphate of ammonia, and watered with it in October, a bed (twenty feet long by four feet two inches wide) destined to be planted with Ranunculuses. They bloomed very strong in this bed, some of the flower-stems were two feet high; the blooms averaging between three and four inches in diameter; the roots also lifted large and clean.—*Flor. Cab.*

Chalk may be applied in large quantities, twenty or thirty tons per acre, to render a light siliceous soil more retentive or a heavy soil more open. Its basis, lime, enters into the composition of most plants in some state of combination. It is very far from immaterial where this mineral is obtained from to improve the staple of our soils. Those chalks which are merely carbonate of lime, with a trace of oxide of iron, are unexceptionable; but there are some which contain phosphate of lime, and these are very much to be preferred. Mr. Brande states the chalk of Brighton to be thus constituted.

Carbonate of lime . . .	98.57
—magnesia . . .	0.38
Phosphate of lime . . .	0.11
Oxides of iron and manganese	0.14
Alumina and silica . . .	0.80

If the chalk is to be burnt into lime before it is applied, care should be taken that it does not contain, like some of the Yorkshire chalks, a large proportion of carbonate of magnesia. Magnesia remains long in a caustic state, and has been found injurious to the plants to which it has been applied.

Chloride of Lime gradually gives out a portion of its chlorine, and is converted into muriate of lime, a very deliquescent salt, which can hardly exist in any soil, however light, without keeping it moist; and its nauseous odour may be found to keep off the attacks of the fly, and other vermin. A solution containing one ounce in five gallons of water, is said to destroy the aphids and the caterpillar, if poured over the trees they infest.

Gas Lime is a hydro-sulphuret of lime, with a little ammonia. It is an excellent manure, especially to cabbages, turnips, cauliflowers, and brocoli, dug in at the time of planting or sowing. If sown over the surface at the time of inserting the crop, at the rate of twenty bushels per acre, it will effectually drive away the turnip-fly, slug, &c.

Gypsum, or Plaster of Paris, is sulphate of lime, composed of

Sulphuric acid	43
Lime	33
Water	22

It has been found very useful as a top dressing to lawns, and dug in for turnips and potatoes. Three hundred weight per acre is abundance.

Nitrates of Potash (Saltpetre), and of *Soda* (Cubic Petre), have been found beneficial to carrots, cabbages, and lawns. One pound to a square rod of ground is a sufficient quantity. Both these nitrates have been found beneficial to potatoes in Scotland. Mr. Murray says that, from 1810 down to the present time, he has been in the habit of watering pinks and carnations with solutions of these two nitrates, and the benefit has been uniform and eminent in promoting their luxuriance.—*Gard. Gaz.*

They have also been given in solution with great benefit to lettuces, celery, fuchsias, and dahlias. One pound to twelve gallons of water. Nitrate of Soda destroys slugs.

Phosphate of Lime.—The importance of bones and other manures containing phosphoric salts as a general manure,

is further sustained by the experiments of Dr. Jackson, the American chemist. He found phosphates in peas and beans of various kinds, in pumpkin seeds, chestnuts, potatoes, raspberries, and turnips. See *Bones*.

Super-Phosphate of Lime.—Chrysanthemums were much increased in vigour when watered with a solution of this salt in the Chiswick Garden, at the end of July. It is thought, if the application had been made earlier, the benefit would have been still more marked. Professor Lindley says this salt seems to have a beneficial effect on most plants, and that it may be applied in different proportions without the least risk of injuring the plants.—*Gard. Chron.*

Heaths appear to like it. The best practical mode of obtaining super-phosphate of lime for manure, is to pour one pound of sulphuric acid, mixed with one pound of water, upon each two pounds of bone dust, allowing the mixture a week to complete the decomposition. Sulphate of lime and super-phosphate of lime are the result. The Duke of Richmond and others have tried this with very great success upon turnips. It being in a liquid form, it must be mixed with earth to facilitate its application, or else be applied through the rose of a watering-pot.

SALT TREE. *Halimodendron*.

SALVIA. See *Clary* and *Sage*. One hundred and five species. The shrubby, stove, and green-house kinds, increase by cuttings; the herbaceous, by division; the annuals and biennials, seeds. Common soil suits them all. *S. patens* makes a splendid bed. The flower-spikes should be cut off for a time, and the young shoots regularly pegged down till they nearly cover the bed, when the flowers will be produced so numerous as to form one mass of intense blue.—*Gard. Chron.*

Mr. Vaux, of Ryde, in the Isle of Wight, says, that there "it ripens seeds perfectly in the open air. Sow it in pots in autumn; put the pots in a cool frame protected from frost, where they may remain during the winter. In the spring, place in the green-house when the seedlings come up; and in the early part of May, bed them out; they bloom beautifully during the summer and autumn. For beds they are superior to

cuttings, as they grow dwarf and more bushy."—*Gard. Chron.*

SAMBUCUS. Elder. Seven species and many varieties. All hardy. The deciduous shrubby kinds are increased by cuttings; the herbaceous perennials, by division. They will grow in any soil. See *Elder*.

SAMOLUS. Three species. Green-house or hardy herbaceous perennials. Division. Common soil, and a rather moist situation.

SAMPHIRE. *Crithmum maritimum*, though a native of the sea-shore, may be cultivated successfully in the garden.

Soil.—It requires a sandy or gravelly soil, and the north side of a wall.

Propagation.—The roots may be planted, or the seed sown, in April; the only cultivation required being to keep the plants free from weeds, and to water it about twice a week with water containing half an ounce of guano and one ounce of salt per gallon.

SAMYDA. Seven species. Stove evergreen shrubs. Cuttings. Loam and peat.

SAND is one of the agents most frequently employed by the gardener in the culture of potted plants. The kind most suitable to his purpose, is either silver sand, or drift river-sand, both of which are silica nearly in a state of purity. These sands being very slow conductors of heat, and affording a ready escape for superfluous moisture, are admirably adapted for promoting the rooting of cuttings, and preventing the damping-off of seedlings. See *Potting, Soil, and Damping-off*.

SAND WOOD. *Bremontiera amoxylon*.

SANGUINARIA. Two species. Hardy tuberous-rooted perennials. Division or seeds. Sandy loam or peat.

SANGUISORBA. Burnet. Eight species. Hardy herbaceous perennials. Division, seeds. Common soil. See *Burnet*.

SANSEVIERA. Fourteen species. Stove herbaceous perennials. Suckers. Sandy loam. *S. carnea* is hardy.

SANTOLINA. Five species. Hardy evergreen shrubs. Cuttings. Common soil.

SANVITALIA procumbens. Hardy trailing annual. Seeds. Common soil.

SAPONARIA. Soapwort. Thirteen species. Hardy annuals and biennials,

hardy and half-hardy herbaceous perennials and creepers. Division, seeds, and also by young cuttings of the branching species. Sandy loam and peat.

SARACHA. Three species. Hardy trailing annuals. *S. viscosa*, a green-house deciduous shrub, is increased by cuttings, the others by seeds. Common soil.

SARCANTHUS. Six species. Stove orchids. Cuttings. Moss, potsherds, and wood, and a moist atmosphere.

SARCOCAPNOS enneaphylla. Hardy herbaceous perennial. Seeds or cuttings. Common soil, rock work.

SARCOCAULON. Three species. Stove evergreen shrubs. Cuttings. Loam, peat, leaf-mould, and sand.

SARCOCEPHALUS esculentus. Stove evergreen shrub. Cuttings. Loam, peat, and sand.

SARCOLOBUS. Two species. Stove evergreen twiners. Cuttings. Rich mould.

SARCOPHYLLUM carnosum. Green-house evergreen shrubs. Young cuttings. Loam, peat, and sand.

SARCOSTEMMA. Two species. Stove evergreen twiners. Cuttings. Sandy loam.

SARRACENIA. Side Saddle Flower. Five species. Half-hardy herbaceous perennials. Divisions. Peat and sphagnum. They require a close damp atmosphere.

SASSAFRAS. *Laurus sassafras*.

SATUREIA. Savory. Seven species. Hardy and half-hardy evergreen shrubs, and herbaceous perennials. *S. hortensis* is an annual. Division, slips, cuttings, seeds. Dry light sandy soil. See *Savory*.

SATYRIUM. Eight species. Green-house tuberous-rooted orchids. Division. Sandy loam and peat.

SAURAUJA. Two species. Stove evergreen shrubs. Ripe cuttings. Loam and peat.

SAUROGLOSSUM elatum. Stove orchid. Division. Sandy peat.

SAUSSUREA. Twelve species. Hardy herbaceous perennials. Division or seeds. Common soil.

SAUVAGESIA. Two species. Stove annuals. Seeds. Peat and loam.

SAVORY. *Satureia*.

S. montana, winter or perennial savory. *S. hortensis*, summer or annual savory.

They may be sown in the open ground in spring. In the latter end of March or in April, sow the seed in a light rich soil, moderately thick, and rake them in evenly; the seedlings soon come up; give occasional weeding, and thin them moderately, and they may either remain where sown, or may be transplanted. Observe, however, of the Winter Savory, that when the seedlings are about two or three inches high, it is eligible to plant out a quantity of the strongest, in moist weather, in nursery rows six inches asunder, to remain till September or spring following, then to be transplanted with balls where they are finally to remain, in rows a foot asunder. But the Annual or Summer Savory may either remain where sown, thinning the plants to six or eight inches' distance, or when two inches high may be pricked out in beds, in rows the above distance; in either case the plants will become useful in June or July, and until winter. Or when designed to have the Winter or Summer Savory remain where sown, the seeds may be sown in shallow drills, either in beds, or along the edge of any bed or border by way of an edging.

By Slips, &c.—In the spring or early part of summer, the Winter Savory may be increased plentifully by slips or cuttings of the young shoots or branches, five or six inches long; plant them with a dibble, in any shady border, in rows six inches asunder, giving occasional waterings, and they will be well rooted by September, when they may be transplanted.

SAW-DUST mixed with dung of any sort speedily decays, and forms a very valuable manure. In one instance, the dung of four rabbits and their young ones, saw-dust in their hutches being used instead of straw, was the only manure used upon one-quarter of an acre.—*Gard. Chron.*

SAW-FLY. See *Athalia*.

SAWS for garden pruning must have a double row of teeth, to obviate the tendency to nip, that the dampness of green wood and the leverage of the branch occasions. One with a very narrow blade, and one with a handle six feet long, will be found convenient. The face of the wound made by a saw should always be cut smooth with the knife, otherwise the wet lodging on its

rough surface occasions decay. See *Bill*.

SAW-WORT. *Serratula*.

SAXIFRAGA. Saxifrage. Ninety-two species, and some varieties. Chiefly hardy herbaceous perennials; a few are annuals, and some half-hardy.—Seeds. Division. Light sandy soil.

SCABIOSA. Seven species. Hardy herbaceous perennials. Seeds. Common soil.

SCABIOUS. *Scabiosa*.

SCÆVA. Hawk Fly. Of this genus there are several species, of which the most common are *S. ribesii* and *S. pyrastræi*. Wherever aphides are abundant, whether on the cabbage, hop, or elsewhere, there is a fleshy green maggot. This is the larva of a hawk-fly, and should be left undisturbed, as it is a voracious destroyer of plant lice.—*Gard. Chron.*

SCÆVOLA. Eight species. Green-house herbaceous perennials, or stove evergreen shrubs. Cuttings. Turfy loam, peat, and sand.

SCALLION. See *Ciboule*.

SCARES are but very inefficient protections; for birds soon sit on the very branches which bear the malkin. To frighten them effectually, it is best to employ boys, for the short time scaring is required. Over seed beds a net is the best protection; but threads tautened across the beds, are said to be equally efficacious.

SCARLET POMPONE. *Lilium pomponium*.

SCEPTRANTHES Drummondii. Half-hardy tuberous-rooted perennial. Offsets. Rich mould.

SCHELHAMMERA. Two species. Green-house herbaceous perennials. Division. Peat and loam.

SCHIMIDELIA. Five species. Stove evergreen tree. Ripe cuttings. Loam and peat.

SCHINUS. Two species. Stove evergreen tree and shrub. Ripe cuttings. Common soil.

SCHIZÆA. Five species. Stove, green-house, and hardy herbaceous perennials. Division or seeds. Peat and loam.

SCHIZANDRA coccinea. Green-house evergreen trailer. Ripe cuttings. Sandy loam and peat.

SCHIZANTHUS. Six species. Hardy annuals. Seeds. Light soil.

SCHIZOMERIA ovata. Green-house

evergreen shrub. Cuttings. Loam and sandy peat.

SCHIZOPETALON *Walkeri*. Half-hardy annual. Seeds. Loam, peat, and sand.

SCHOMBURGHIA. Three species. Stove orchids. Division. A block of wood, or turfy beath mould and potsherds.

SCHOTIA. Five species. Stove or green-house evergreen shrubs. Cuttings. Loam and peat.

SCHRADERA *cephalotes*. Stove evergreen climber. Cuttings. Loam, peat, and sand.

SCHRANKIA. Two species. Stove and half-hardy herbaceous perennials. Young cuttings or division. Loam, peat, and sand.

SCHUBERTIA *graveolens*. Stove evergreen twiner. Cuttings. Loam, peat, and sand.

SCIARA. A genus of Midges. *S. pyri*, Small Pear Midge. *S. Schmidbergeri*, Large Pear Midge. When a fallen pear is cut open, it is often found core-eaten, and with a brown powder marking the progress of the assailant. This is caused by the larva of these insects. The midges appear early in July. M. Kollar says, that the small pear midge has club-shaped halteres, the club dark brown, and the stem whitish. When alive, the abdomen is of a lead colour, with black wings. The head and thorax are black, as are also the antennæ; the palpi are of a pale yellow, the feet whitish, and the tarsi black.

The *Large Pear Midge* appears about the same time as the preceding. M. Kollar thus describes it: "The female is little more than a line long, and half a line thick, also much larger than the smaller pear midge; the male is more slender, and somewhat shorter. The antennæ are blackish, and not so long as the body. The head is black and shining, as is also the thorax; the proboscis ash-gray, the abdomen of the male a deep black, that of the female browner, with black wings; the anal point, however, is quite black. The feet ash-gray, and the tarsi and wings black. They both survive the winter, and deposit their eggs in the blossom, when it opens in early spring. The larva eats its way into the core of the young fruit, and again eats its way out at one side, when the time arrives for

it to bury itself in the ground, and pass into the chrysalis form."—Kollar.

SCILLA. Squill. Thirty-one species, and many varieties. All bulbous perennials, and chiefly hardy. *S. brevifolia* is a green-house, *S. indica* is a stove species. Offsets. Light soil.

SCIODAPHYLLUM. Seven species. Stove or green-house evergreen trees, shrubs, and climbers. Cuttings. Loam, peat, and sand.

SCION is the portion of the branch selected for insertion in the stock, and destined to become the future plant. The following directions, given by Mr. Loudon, embrace all the information generally applicable to the subject. All particular directions will be found under the title of the plant to be grafted from:—

"Scions are generally the shoots of last summer's growth, from the outside lateral branches of healthy trees, because in them the shoots are not so robust and apt to run to wood as in the centre and top of the tree, nor so weak as those which are at its base, and under the shade and drip of the rest. An exception to this rule is to be found in the case of debilitated trees, where the scions should be taken from the strongest shoots. The middle part of each shoot makes always the best scion; but long shoots, and especially where the scion is of a rare variety, may be cut into several scions of four or six inches in length, reserving not fewer than two nor more than five eyes to form the future head of the tree.

"Scions should be cut several weeks before the season for grafting arrives; the reason is that grafting may most successfully be performed by allowing the stock to have some advantage over the graft in forwardness of vegetation. It is desirable that the sap of the stock should be in brisk motion at the time of grafting; but by this time the buds of the scion, if left on the parent tree, would be equally advanced; whereas, the scions being gathered early, the buds are kept back, and ready only to swell out when placed on the stock. Scions of pears, plums, and cherries are collected in the end of January or beginning of February. They are kept at full length, sunk in dry earth, and out of the reach of frost, till wanted, which is sometimes from the middle of February to the middle of March.

Scions of apples are collected any time in February, and put on from the middle to the end of March. The Scions are used as gathered."—*Enc. Gard.*

It is quite true that the scion "overrideth the stock;"—a peach scion produces its peculiar foliage, fruit, &c., though grafted upon a plum stock; yet the stock influences the habits and produce of the scion. Thus an apricot is said to have been worked on a green-gage plum, and a quince upon the autumn bergamot pear; the apricot became as juicy as the green-gage, and far more delicate; the quince was much more tender, and less gritty. See *Stocks and Grafting*.

Fig. 151.



SCISSORS of various sizes are required by the gardener. A pair with very sharp and pointed blades is required for cutting away the anthers of flowers in hybridizing. Stouter pairs are used for removing flower stalks, when the petals have fallen from roses, &c. Sliding pruning scissors (Fig. 151) are employed for cutting the shoots of shrubs; they are powerful instruments for the purpose. See *Shears*.

SCLEROTHAMNUS *microphyllus*. Green-house evergreen shrub. Cuttings. Sandy loam and peat.

SCOLOPENDRIUM. Two species, and many varieties. Ferns. Hardy herbaceous perennials. Seeds and division. Rock work.

SCOLYMUS. Three species. *S. maculatus* is a hardy annual, the others hardy herbaceous perennials. Division or seeds. Common soil.

SCOLYTUS. A genus of Beetles. *S. hæmorrhous*, small Bark Beetle, attacks apple trees in May, making furrows into the inner bark and alburnum, where it deposits its eggs. The larvæ continue feeding there until late in autumn.

S. destructor, elm-destroying Scolytus, does not confine its ravages to the elm, but often attacks fruit trees, as the plum.—*Kollar*.

SCOPARIA *dulcis*. Stove annual. Seeds. Sandy loam.

SCOPOLIA *carniolica*. Hardy herbaceous perennial. Division. Light dry soil.

SCOPULA *forficatis*, Garden Pebble Moth, is thus accurately described by Mr. Curtis:—"The perfect insect measures rather more than an inch across, when its wings are expanded. The upper pair are hazel-coloured, with four stripes, two of which are distinct, and the other faint; the under wings as well as the body are whitish, and on the former, near the centre, there is a curved brown streak and another black on the margin. The first brood of caterpillars occurs in May, and the second in the autumn; and when very numerous they do considerable injury to cabbages and plantations of horse-radish. The caterpillar is eight or ten lines long, with the head of a light brown colour, and the body is yellowish green, with black longitudinal stripes. Almost the only method of destroying these caterpillars, is to hand-pick them, which, from their small size, will be very tedious; if, however, a mat or piece of linen be laid under the infested plants, they may be shaken into it, and thus a great number be collected in a short time."—*Gard. Chron.*

SCORPION. *Genista scorpius*.

SCORPION GRASS. *Myosotis*.

SCORPION SENNA. *Coronilla emerus*.

SCORZONERA. Seventeen species. Hardy herbaceous perennials. *S. villosa* is a biennial. Seeds. Common soil.

S. hispanica. Common Scorzonera. Though a perennial, yet, for general use, it should be treated as an annual. Sow annually in any open light spot of ground, the latter end of March or beginning of April, not earlier, lest the plants run to seed. Trench the ground, and with the bottom spit turn in a little dung; sow in shallow drills, twelve inches asunder, raking the mould evenly over them half an inch deep. The plants will rise in two or three weeks. When they are a little advanced in growth, let them be thinned and cleaned from weeds by hoeing. Thin the plants to ten inches' distance; they will grow freely, and their roots continue increasing in size till September, when they will have acquired their full

size, discoverable by their leaves beginning to decay.

The roots may either remain in the ground, to be drawn as wanted, or taken wholly up in autumn when their leaves decay, and preserved in sand all winter.

To save seed.—Let some of the plants remain where sown, when they will shoot up in the spring, and produce plenty of seed in autumn.—*Abercrombie.*

SCOTCH ASPHODEL. *Tofieldia alpina.*

SCOTCH LABURNUM. *Cytisus alpinus.*

SCOTTIA. Three species. Greenhouse evergreen shrubs. Young cuttings. Sandy loam and peat.

SCREEN. All cooling is occasioned either by the heat being conducted from a body by a colder, which is in contact with it, or by radiating from the body cooled, though circumstances accelerate or retard the radiation; and whatever checks the radiation of heat from a body is a screen, and keeps it warmer.

For example, a thermometer, placed upon a grass plot, exposed to a clear sky, fell to 35° ; but another thermometer, within a few yards of the preceding, but with the radiation of the rays of heat from the grass checked by no other covering than a cambric pocket handkerchief, declined no lower than 42° . No difference of result occurs whether the radiating surface be parallel or perpendicular to the horizon; for when the mercury in a thermometer, hung against an openly exposed wall, fell to 38° , another thermometer, against the same wall, but beneath a web of gauze stretched tightly, at a few inches distance, indicated a temperature of 43° .

These results explain the beneficial operation of apparently such slight screens to our wall-fruit when in blossom. A sheet of canvas or of netting prevents the direct radiation of heat from the wall; the cooling goes on more slowly, and is not reduced to that of the exterior air at night, before the return of day begins to re-elevate the external temperature.

The colder the body surrounding another body, the more rapid the radiation from the latter; for it is a law of heat that it has a constant tendency to be diffused equally; and the greater the diversity of temperature between

two bodies in contact with each other, the greater is the rapidity with which the progress towards equilibrium goes on. This is one reason why a temperature of 32° , with a brisk wind attending it, will injure plants to a far greater extent than a temperature many degrees lower, with a still atmosphere; but it is aided by the operation of another law of heat, viz., that æriform bodies convey it from a cooling body, as a wall or a tree, by an actual change in the situation of their own particles. That portion of the air which is nearest to the cooling body is expanded, and becoming specifically lighter, ascends, and is replaced by a colder portion. This, in its turn, becomes heated and dilated, and gives place to another colder portion. And thus the process goes on, until the cooling body is reduced to the same temperature as the air.

In a still atmosphere, this goes on slowly; the air in contact with the wall and tree rises very gradually as it imbibes warmth from them; but if there be a brisk wind, a constant current of air at the lowest temperature then occurring, is brought in constant contact with them, and the cooling is rapid, in accordance with the law of equilibrium just noticed. A shelter of netting, or even the sprays of evergreens, are of the greatest service in preventing the sweeping contact of cold air at such times. Snow is a good shelter; it prevents heat radiating from plants; protects them from the chilling blasts; and is one of the worst conductors of heat. I have never known the surface of the earth, below a covering of snow, colder than 32° , even when the temperature of the air above has been 28° .

Strange as it may appear, yet it is nevertheless true, that a screen is more beneficial in preserving the temperature of trees, when from three to six inches from them, than when in immediate contact with their surfaces. When a woollen net was suspended four inches from the wall on which a peach tree was trained, the thermometer fell very slowly, and the lowest degree it reached was 38° ; when the same screen was twelve inches off, it fell to 34° ; and when drawn tightly over the tree, it barely kept above 32° , the temperature of the exterior air. When at twelve inches from the wall, it permit-

ted the too free circulation of the air; and when in immediate contact with the polished bark of the peach, perhaps another law of cooling came into operation. The law is, that polished surfaces radiate heat slowest. Thus, if two glass bottles, equal in size and thickness of glass, and of the same shape, be filled with warm water, and one of the bottles be covered with an envelope of fine muslin, this bottle will give out heat to the surrounding air with much greater rapidity than the other bottle; so that, in a given time, the bottle with the envelope will be found colder than the one which has no covering.

Screens, such as the preceding, or the slighter agents, sprays of evergreens, placed before the branches of wall-trees or other plants, as already noticed, operate beneficially in another way, checking the rapid passage of the air over them: such passage is detrimental in proportion to its rapidity, for the more rapid it is, the greater is the amount of evaporation, and, consequently, of cold produced. Mr. Daniell says, that "a surface which exhales one hundred parts of moisture when the air is calm, exhales one hundred and twenty-five parts when exposed to a moderate breeze, and one hundred and fifty parts when the wind is high."

During all high winds, but especially when blowing from points varying between the east and the south, for they are the driest in this country, the gardener will always find shelter is beneficial to his plants, whether in blossom, or with fruit in its first stages of growth, for these winds cause an evaporation much exceeding in amount the supply of moisture afforded by the roots.

In March, such shelters are much required, for the winds are then violent and dry even to a proverb; but it is during the days of its successor, April, that sets in the only periodical wind known in this island. It comes intermittingly, and with a variable force from points ranging from east to north-east, and is one of the most blighting winds we have. It continues until about the end of the second week in May, though often until its close; and it is a good plan to have the tree, during the whole period, by day as well as by night, protected. This periodical wind is occasioned, probably, by Swe-

den and Norway remaining covered with snow, whilst England is some 20°, or more, warmer; and an upper current of warm air is consequently flowing hence to those countries, whilst a cold under current is rushing hither to supply its place. This wind, and its consequent cold weather, is so regular in its appearance, that in Hampshire, and some other parts of England, the peasantry speak of it as the black thorn winter, that bush being in blossom during a part of its continuance.—*Princ. of Gard.*

Not only are screens required for out-door plants, but for those under glass; and Mr. Paxton is quite right in saying, that "one of the things which should be constantly borne in mind, and more especially in the forcing season, is the most effectual means of keeping up the requisite temperature in the hot-houses with least fuel; and that, in all cases where practicable, the use of external coverings, if properly used, will render strong fires in a great measure unnecessary. Some coverings are used at Chatsworth constantly at night, which makes from ten to fifteen degrees difference in the temperatures of the houses where they are applied, and to maintain which, without them, would consume three times the quantity of fuel now necessary."—*Gard. Chron.*

For wall-trees, now that glass is become so much cheaper, the best of all screens may be employed, viz., glazed frames, of a length extending from the coping of the wall, to the surface of the soil, about two feet from the stems of the trees.

SCREW PINE. *Pandanus.*

SCREW TREE. *Helicteres.*

SCROPHULARIA. *Figwort.* Seven species. Hardy herbaceous perennials. *S. vernalis*, a biennial. Seeds. Light soil, and a moist situation.

SCRUBBY OAK. *Lophira africana.*

SCURVY GRASS. *Cochlearia officinalis.* "This vegetable grows spontaneously on the sea shores of England, and is also found in the interior. It is used like the Cress, and occasionally mixed with corn salad.

"Sow in autumn and manage as directed for winter spinach; it is used during the winter and spring."—*R. Reg.*

To obtain Seed.—A few plants must be left ungathered from in the spring. They will run up to flower about May,

and perfect their seed in the course of the two following months.

SCUTELLARIA. Twenty-seven species. Hardy herbaceous perennials. *S. humilis* is a half-hardy. *S. havenensis*, a stove herbaceous perennial. Seeds and division. Common soil. The shrubby species increase by young cuttings.

SCYPHANTHUS *grandiflorus* and *elegans*. Hardy twining annuals. Seeds. Sandy loam.

SCYTHE. This mowing implement being confined, in the garden, to cutting the fine short grass of lawns, requires to be much sharper than that used in cutting the coarser grasses, which stand up more firmly to the scythe. It is also necessary that the mowers should not *score* the grass, that is, should not leave the mark of each stroke of the scythe, which has a very unsightly appearance; to prevent which, have the scythe laid out rather wider, an inch or two beyond heel and toe, especially for very short grass; and in mowing, keep the point rather out, and do not draw that part too fast toward, gathering the grass neatly to the left in a range; and having mowed to the end of the swaith, mow it lightly back again, to trim off all scores, and other irregularities, unavoidably left the first time. —*Abercrombie*.

SEA-BUCKTHORN *Hippophaë*.

SEAFORTHIA *elegans*. Stove palm. Seed. Turfy loam and sand.

SEA-HEATH. *Frankenia*.

SEA-HOLLY. *Eryngium*.

SEA-KALE. *Crambe Maritima*.

Soil and Situation.—A light moderately rich soil, on a dry substratum, suits it best, though in any dry soil it will succeed. A bed may be composed for it of one-half drift sand, one-third rich loam, and one-third small gravel, road stuff or coal-ashes; if the loam is poor, a little well-rotted dung or decayed leaves being added. The soil must be deep, so that the roots can penetrate without being immersed in water, which invariably causes their decay. The depth should not be less than two feet and a half; and if not so naturally, worked to it by trenching. If at all tenacious, this opportunity may be taken to mix with it drift or sea-sand, so as to reduce it to a friable texture. If wet it must be drained, so that water never shall stand within three feet of the surface. If poor, well putrefied

dung must be added; but decayed leaves are preferable, and sea-weed still more so. Common salt is a very beneficial application, either applied dry, in the spring, in the proportion of twenty or thirty bushels per acre, or by occasional waterings, with a solution, containing four ounces in the gallon, round every stool during the spring. The situation cannot be too open and free from trees.

Propagation is both from seed and slips of the root. The first is the best mode; for, although from slips it may be obtained with greater certainty, yet the plants arising from seed are the strongest and longest lived. Sow from October to the commencement of April; but the best time for inserting it is during January or February. Leave the plants where raised; and, to guard against failure, insert the seed in patches of six or twelve seeds, each six inches apart, and the patches two feet asunder. If intended for transplanting, the seed may be sown in drills twelve inches asunder; in either case it must not be buried more than two inches below the surface; and it is a good practice, previous to inserting it, to bruise the outer coat of the seed, without injuring its vegetating power, as by this treatment the germination is accelerated. The plants will in general make their appearance in four or five months, never sooner than six weeks; but, on the other hand, the seed will sometimes remain twelve months before it vegetates.

The best time for increasing it by slips is in March. Rooted suckers may be detached from established plants; or their roots, which have attained the thickness of the third finger, be cut into lengths, each having at least two eyes. The cuttings must be inserted in an upright position, two or three inches beneath the surface. It is best to plant two together, to obviate the danger of failure, at two feet apart, to remain. Some persons, from a desire to save a year, recommend yearling plants to be obtained and inserted in February or March; but as the shoots ought not to be cut for use the first season after planting, the object is not attained, for seedlings may be cut from the second year.

The beds should be laid out three feet wide, and a two feet alley between

every two, in preference to the plan sometimes recommended of planting three rows in beds seven feet wide. If the months of June and July prove dry, the beds should be plentifully watered. The seedlings require no other attention, during the first summer, than to be kept free from weeds, and to be thinned to five or six in each patch. When their leaves have decayed and are cleared away, about November, they must be earthed over an inch or two with dry mould from the alleys, and over this about six inches depth of long litter spread. In the following spring the litter is to be raked off, and a little of the most rotten dug into the alleys. When the plants have perfectly made their appearance they must be thinned, leaving the strongest plant, or, as Mr. Maher recommends, the three strongest, at each patch, those removed being transplanted at similar distances if required; but it must be remarked, that those transplanted never attain so fine a growth, or are so long lived. In the second winter the earthing must be increased to five or six inches deep over the crowns, and the covering of litter performed as before. In the third spring, the litter being removed, and some dug into the alleys, as before, about an inch depth of drift sand or coal-ashes must be spread regularly over the surface. The sprouts may now be bleached and cut for use; for, if this is commenced earlier, the stools are rendered much less productive and much shorter lived. In November, or as soon as the leaves are decayed, the beds being cleared of them, the coating of sand or ashes removed, and gently stirred with the asparagus-fork, they must be covered with a mixture of three parts earth from the alleys, and one part of thoroughly decayed leaves, to the depth of three or four inches. The major part of this is to be removed in the following spring, the beds forked, and the covering of sand renewed, this routine of cultivation continuing during the existence of the beds.

The above course is the one also pursued if the plants are raised from off-sets or cuttings, as it is by much the best practice not to commence cutting until they are two years old.

Blanching may commence the second spring after sowing. The most simple mode is that originally adopted, namely,

to cover over each stool sand or ashes to the depth of about a foot; the shoots, in their passage through it, being excluded from the light, are effectually bleached. Dry clean straw may be scattered loosely over the plants to effect the same purpose. But pots are by much to be preferred to any of these coverings. Common flower-pots, of large dimensions, may be employed, care being taken to stop the hole at the bottom with a piece of tile and clay, so as to exclude every ray of light; but those suggested by Mr. Maher are ge-

Fig. 152.



nerally adopted. They are of earthenware, twelve or eighteen inches in diameter, and twelve high. Mr. Sabine improved upon them by making the top moveable, which prevents the trouble arising from the escape of the spreading shoots, or the entire removal of the dung at the time of forcing. Frames of wicker are sometimes employed, being covered with mats more perfectly to exclude the light. See *Rhubarb*.

Previously to covering the stools with the pots, &c., the manure laid on in the winter must be removed; and the operation should commence at the close of February, or at least a month before the shoots usually appear, as the shelter of the pots assists materially in bringing them forward. In four or six weeks after covering the plants should be examined, and as soon as they appear three or four inches high, they may be cut; for if none are taken until they attain a fuller growth, the crop comes in too much at once. In order to prolong the season of production, Mr. Barton recommends plants to be raised annually, so that every year a cutting may be had from a yearling crop, which come in much later, and consequently succeed in production the old established roots. The shoots should be cut whilst young and crisp, not exceeding five or six inches in height; the section to be made just

within the ground, but not so as to injure the crown of the root. Slipping off the stalks is much preferable to cutting. The plants may be gathered from until the flower begins to form, when all covering must be removed. If, when arrived at the state in which brocoli is usually cut, the flower is employed as that vegetable, it will be found an excellent substitute. When the cutting ceases, all covering must be removed, and the plants be allowed to grow at liberty.

To obtain Seed.—A stool, which has not been cut from, or even covered at all for blanching, must be allowed to run in spring. It flowers about June, and produces abundance of seed on every stem, which ripens about the close of July, or early in August.

Forcing.—To force sea-kale, some established plants, at the end of October or early in November, being trimmed as directed above at that season, and the bed covered with a mixture of moderately sifted light earth, and sand or coal ashes, two or three inches deep, each stool must be covered with a pot, set down close, to keep out the steam of the dung; or, bricks or planks may be placed to the height of eight or ten inches on each side of the row to be forced, and covered with cross spars, having a space of about an inch between them. The dung employed must be well tempered and mixed for three weeks before it is required, or for four, if mingled with leaves, otherwise the heat is violent, but transient. When thus prepared, each pot is covered ten inches thick all round, and eight inches at the top. The heat must be constantly observed; if it sinks below 50°, more hot dung must be applied; if above 60°, some of the covering should be removed. Unless the weather is very severe, it is seldom necessary to renew the heat by fresh linings; when the thermometer indicates the necessity, a part only of the exhausted dung should be taken away, and the remainder mixed with that newly applied. In three or four weeks from being first covered, the shoots will be fit for cutting, and they will continue to produce at intervals for two or three months, or until the natural crops come in. To have a succession, some should be covered with mulch, or litter that is little else than straw; this, by sheltering the

plants from cold, will cause them to be forwarder than the natural ground ones, though not so forward as those under the hot dung; and by this means it may be had in perfection from Christmas to Whitsuntide.

It also may be forced in a hot-bed. When the heat moderates, a little light mould being put on, three or four year old plants, which have been raised with as little injury as possible to the roots, are to be inserted close together, and covered with as much earth as is used for cucumbers. The glasses must be covered close with double matting to exclude the light, and additional covering afforded during severe weather. Sea-kale, thus forced, will be fit for cutting in about three weeks. Instead of frames and glasses, any construction of boards and litter that will exclude the light, would undoubtedly answer as well. A common melon frame will contain as many as are capable of being produced in two drills of twenty yards each, and with only one-third the quantity of dung. To keep up a regular succession until the natural ground crop arrives, two three-light frames will be sufficient for a large family; the first prepared about the beginning of November, and the second about the last week in December. Another mode is, on each side of a three-foot bed to dig a trench two feet deep, the side of it next the bed being perpendicular, but the outer side sloping, so as to make it eighteen inches wide at the bottom, but two feet and a half at the top. These trenches being filled with fermenting dung, which of course may be renewed if ever found necessary, and frames put over the plants, the light is to be completely excluded by boards, matting, &c.

Unlike the generality of vegetables, the shoots of forced sea-kale are always more crisp and delicate than those produced naturally. Those plants will not do for forcing a second time which have been forced in frames; consequently a small bed should be sown every year for this purpose, so that a succession of plants may be annually had, they not being used until three years old. Sometimes a plant will send up a flower-stalk; this must be immediately cut away, it will then be as productive as the others. But those plants which are forced by whelming dung over the pots,

are not much detrimented for the natural ground production of the succeeding year. When, therefore, they have done producing, all covering must be removed, and the ground dressed.

SEA-LAVENDER. *Statice*.

SEASIDE GRAPE. *Coccoloba*.

SEASIDE LAUREL. *Xylophylla latifolia*.

SEATS require to be in unison with the portion of the pleasure-grounds in which they are placed. In shady retired spots, they may be made of the limbs of trees, (see *Rustic*;) but near the house, or among the parterres, where trimness is the prevailing characteristic, more art is desirable to be apparent in their construction. They may be made of wood, and so constructed as to shut up, so that the seat is never wet; and if painted annually they last for many

years. Made of iron, they are more light in appearance, and if painted yearly will not iron-mould dresses which rest upon them. Being made of open work, the wet does not rest upon them, and they are soon dry even after heavy rains.

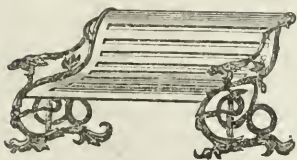
The following (Figs. 153, 154) are made

by Messrs. Dean, King William Street, London.

Fig. 153.



Fig. 154.



SEA-WEED. See *Green Manure*.

SEBÆA. Four species. Green-house annuals. Seeds. Peat and loam or common soil.

SECAMONE. Three species. Stove evergreen twiners. Cuttings. Sandy loam.

SECURIDACA. Two species. Stove evergreen twiners. Cuttings. Loam, peat, and sand.

SECURIGERA *coronilla*. Hardy annual. Seeds. Common soil.

SEDUM. Sixty-four species. Chiefly hardy herbaceous perennials; with a few annuals and biennials. These latter grow well on rock work, and increase by seeds. The green-house species increase by partly ripe cuttings; the rest by cuttings or division. Sandy loam, or loam and brick rubbish. A few are evergreen shrubs and creepers.

SEED ROOM. All that has been said relative to the *Fruit Room*, is applicable to this: everything promotive of decay or germination is to be avoided; and if one relative direction more than another requires to be urged upon the gardener, it is comprised in these words—*keep it as dry as possible*: the room may be even hot, so that it is not damp. Mr. Forsyth says, that “a dry room, hot room, or something very nearly resembling a slow corn-kiln, is essentially necessary in every garden, not only for seeds, but also for all other articles requiring drought, or liable to injury from damp, such as the nets and bunting for wall-trees and the like; garden-mats; glazed lights in wet weather, or when washed previous to painting; and last, though not the least necessary, the proper drying of pot-herbs, a process seldom, if ever properly done.”—*Gard. Chron.*

In such a room should be a nest of very shallow drawers or trays, divided into compartments, each holding a tin box three inches in diameter, and on the lid of each a label, inscribed with the name of the seed. Such an arrangement not only saves the seed, but saves the gardener's time, especially if the seeds are arranged alphabetically in the drawers.

SELAGO. Eighteen species. Green-house evergreen shrubs. Cuttings. Loam, peat and sand.

SELFHEAL. *Prunella*.

SEMPERVIVUM. House-leek. Thirty species. Green-house evergreen shrubs, annuals, and biennials; and hardy and half-hardy herbaceous perennials. The green-house evergreens increase by partly ripened cuttings, and require a mixture of sandy loam and brick rubbish. The hardy kinds increase by offsets, and grow on rocks or walls. The annuals and biennials increase by seed.

SENACIA. Two species. Stove evergreen shrubs. Ripened cuttings. Light rich soil.

SENECILLIS. Two species. Hardy herbaceous perennials. Division. Light rich soil.

SENECIO. Fifty-eight species. Hardy herbaceous perennials and annuals, and green-house evergreen shrubs. The latter increase by cuttings, and require a light rich soil. The hardy kinds increase by division, the annuals and biennials by seed. Common soil suits both the last-named species.

SENSITIVE FERN. *Onoclea Sensibilis*.

SENSITIVE PLANT. *Mimosa*. There are several plants, however, besides the mimosa which give evidence of being sensitive. The Venus Fly Trap (*Dionæa muscipula*) has jointed leaves, which are furnished on their edges with a row of strong prickles. Flies, attracted by honey which is secreted in glands on their surface, venture to alight upon them. No sooner do their legs touch these parts, than the sides of the leaves spring up, and locking their rows of prickles together, squeeze the insects to death. The well-known sensitive plant (*Mimosa sensitiva*), shrinks from the slightest touch. *Oxalis sensitiva* and *Smithia sensitiva* are similarly irritable, as are the filaments of the stamens of the berberry. One of this sensitive tribe, *Hedysarum gyrans*, has a spontaneous motion; its leaves are frequently moving in various directions, without order or co-operation. When an insect inserts its proboscis between the converging anthers of a dog's bane (*Apocynum androsaemifolium*), they close with a power usually sufficient to detain the intruder until death.

SEPTAS. Two species. Green-house herbaceous perennials. Division. Peat, loam and sand.

SEPTEMBER is a month of decay, yet much has to be done to the living.

KITCHEN GARDEN.

Angelica, sow.—*Aromatic* pot-herbs, finish gathering.—*Artichokes*, break down.—*Balm*, plant.—*Beans*, earth up, &c., e.—*Borage*, sow; thin advancing crops.—*Burnet*, plant.—*Cabbages*, sow, for autumn and spring plants; earth up advancing; (Red), are ready for pickling.—*Cardoons*, earth up.—*Carrots*, advancing, thin.—*Flowers*, sow for plants to preserve under glass during winter.—*Celery*, earth up.—*Chervil*, sow.—*Coleworts*, plant out.—*Cori-*

ander, sow.—*Corn Salad*, sow.—*Cress* (American), sow, b.; (Water), plant.—*Dill*, sow.—*Earthing-up*, attend to.—*Endive*, plant; attend to; blanch, &c.—*Fennel*, plant.—*Finocchio*, earth up.—*Herbary* requires dressing, b.—*Hoeing*, attend to.—*Hyssop*, plant.—*Jerusalem Artichokes*, take up as wanted, e.—*Kidney Beans*, earth up advancing, b.—*Leeks*, plant, b; attend to advancing.—*Lettuces*, sow for autumn and spring planting.—*Mint*, plant.—*Mushroom-Beds*, make; Spawn, collect.—*Nasturtium-berries*, gather as they become fit. (Potato), take up for storing.—*Orach*, sow.—*Parsley*, cut down.—*Peas*, hoe, &c.—*Pennyroyal*, plant.—*Pot Marjoram*, plant.—*Radishes*, sow, b.—*Rhubarb*, sow.—*Sage*, plant.—*Savory*, plant.—*Seeds*, gather as they ripen.—*Small Salading*, sow.—*Sorrel*, plant.—*Spinach*, sow, b.—*Tansy*, plant.—*Tarragon*, plant.—*Thyme*, plant.—*Turnips*, sow, b.; hoe advancing.

ORCHARD.

Composts, prepare.—*Dress* borders by forking, so soon as fruit is gathered.—*Gathering* of Apples and Pears to store commence, e.—*Grapes*, bag, to protect from wasps, &c.—*Layers* and cuttings may still be inserted.—*Leaves*, be careful not to injure or remove from Wall Trees.—*Nets*, spread over fruit trees, to protect from birds.—*Plantations*, intended, prepare ground for, by trenching, &c.—*Planting* may be commenced, e., in some kinds of Apricots, Peaches, &c.—*Strawberries*, plant in moist weather; clean old beds; pot for forcing.—*Stones* of fruit save, to sow for stocks.—*Vines*, remove straggling useless shoots.—*Wall-trees*, generally, look over and train as required.—*Wasps*, entrap in bottles, &c.

FLOWER GARDEN.

Aconite (Winter), plant, e.—*Anemones*, plant best, e.; sow, b.—*Annuals* (Hardy), sow, b.—*Auriculas* not shifted in August, now remove; water and shade; prepare awning to protect, in autumn and winter; sow, b.—*Bulbous roots*, plant for early blooming, e.; sow, b.—*Carnation* layers remove, b.—*Chrysanthemums*, plant cuttings, &c., b.—*Dress* borders assiduously.—*Edgings*, trim; plant.—*Evergreens*, plant, make layers.—*Fibrous-rooted* perennials, propagate by slips, parting roots,

&c.—*Fork* over vacant compartments.—*Grass*, mow and roll; sow, b.—*Gravel*, weed and roll.—*Guernsey Lilies*, pot.—*Heartsease*, plant cuttings; trim old.—*Hedges*, clip, e.—*Mignonette*, sow in pots to shelter in frames.—*Pipings* of *Pinks*, &c., plant out for blooming.—*Polyanthuses*, plant.—*Ranunculuses*, plant best, e.; sow, b.—*Seedlings*, plant out.—*Seeds*, gather as ripe.—*Transplant* perennials, e.—*Tuberous* rooted plants, transplant.—*Turf*, lay.—*Water* annuals and other plants every day in dry weather.

HOT-HOUSE.

Air, admit freely every day.—*Bark-beds*, renew.—*Bulbs*, plant, b.—*Composts*, prepare.—*Dress* the plants regularly.—*Earth*, give where required.—*Leaves*, wash; remove decayed, &c.—*Pines*, shift, if neglected before, b.; attend to bottom heat; water every third day.—*Propagate* by offsets, seeds, slips, and suckers.—*Shifting* neglected before, complete, b.—*Succulents*, replace under glass.—*Watering* generally is required two or three times weekly.

GREEN-HOUSE.

Air, give very freely to plants returned into house.—*Camellias*, bnd.—*Earth*, give fresh.—*Geraniums* and *Myrtles* planted in borders, return into pots, b.; cuttings, plant, b.—*Glass*, *Flues*, &c., repair, before the plants are moved in.—*Oranges* and *Lemons*, remove into house, e.; thin fruit.—*Prune* and dress as the plants are removed.—*Roses*, pot for forcing.—*Seedlings* and other young plants, if well rooted, transplant, b.—*Succulents*, remove into house, b.; shift into larger pots.—*Suckers*, layers, cuttings, &c., may be planted.—*Tender* plants, generally remove into house, e.—*Water* is not required so freely.

SERAPIAS. Three species. Stove orchids. Division. Light sandy soil.

SERINGIA *platyphylla*. Green-house evergreen shrub. Cuttings.—Sand, loam, and peat.

SERISSA *fatida*. Green-house evergreen shrub. Cuttings. Loam, peat, and sand.

SERPICULA *repens*. Green-house herbaceous creeper. Division. Common soil.

SERRATULA. Saw-wort. Twenty-nine species. Hardy herbaceous per-

ennials, annuals, and biennials. The former, seeds or division; the latter, seeds only. Common soil suits them all.

SERRURIA. Thirty-four species. Green-house evergreen shrubs. Ripe cuttings, taken off at a joint. Light turfy loam, with a little sand.

SERSALISIA *sericea*. Stove evergreen shrub. Cuttings. Loam, peat, and sand.

SERVICE. *Pyrus Sorbus*. There are three varieties. *P. S. maliformis*, apple-shaped; *P. S. pyriformis*, pear-shaped; *P. S. bacciformis*, berry-shaped.

Propagation.—By *Grafting* on the apple, medlar, and hawthorn.

By Cuttings. See *Apple*.

By Seed.—The berries ripen abundantly in autumn, which is the proper time for sowing them when perfectly ripe. Sow them as soon after they are gathered as possible, selecting a spot of lightish ground, and dividing it into four-feet-wide beds, in which sow the berries in drills an inch deep. Some of them will rise the following spring; they, however, frequently remain till the second spring before they come up; observing in either case, that in the spring following, when the seedlings are a year old, they should be planted out in nursery rows, to remain till they acquire a proper size for final transplantation at thirty feet apart.

By Layers.—Having some of the trees while young cut down near the ground, they will throw out lower shoots, which being layered in the common way in autumn and spring, will readily emit roots, and be fit to transplant in nursery rows in one year.

Soil.—Clayey loam well drained suits it best.

Culture.—They are best trained as dwarf standards or espaliers. See *Medlar*.

Gather the fruit in autumn, and treat it like that of the medlar.

SESBANIA. Twelve species. Stove annuals, biennials, or evergreen shrubs. The latter increase by cuttings; the former by seeds. Loam and peat suits them all.

SESUVIUM. Four species. Stove annuals and herbaceous perennials. Partly dried cuttings. Sandy loam and peat.

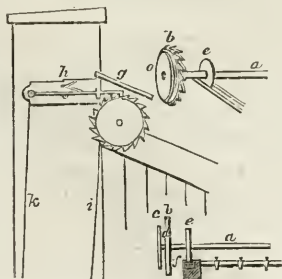
SETHIA *indica*. Stove evergreen tree. Cuttings. Turfy loam and peat.

SETS are the tubers, or portions of tubers, employed for propagating tuberous-rooted plants. It may be accepted as a rule universally applicable to them, that a moderately-sized whole tuber is always to be preferred to a cutting of a tuber. The latter are invariably more subject to failure, but if employed, it is a good plan to roll them in gypsum powder. This checks the escape of their sap, and is friendly to vegetation.

SEYMERIA. Two species. Hardy annuals. Seeds. Peaty soil.

SHADING deserves more attention than it usually obtains, for there is not a plant when in blossom that is not prolonged in beauty and vigour by being shaded from the midday sun. Nor should shading be attended to merely with regard to blooming plants; for they are benefited by it during all periods of their growth. Every plant transpires at a rate great in proportion to the elevation of the temperature; the greater the transpiration the more abundant is the absorption of moisture; and the moment the roots fail in affording a supply equivalent to the transpiration, the leaves flag, or become exhausted of moisture, and if this be repeated often, decay altogether.—Shades, properly managed, prevent this injurious exhaustion. Those used at Sion House deserve particular attention, not only because they are applicable to hot-houses, pits, and hot-beds of every description, but because they may be rendered available in the covering of fruit walls, to exclude the frost from the blossom, and the birds or flies from ripe fruit; and also in the covering of flower beds, hay ricks, harvested corn, temporary structures for public assemblages, &c.

Fig. 155.



“The length of these rolls at Sion House is between fifty and sixty feet, but we have no doubt they might be made longer, since this depends on the diameter of the pole or rod, *a*, and the toughness of the timber employed, or its power to resist torsion. On one end of this rod, and not on both, as is usual, a ratchet wheel, *b*, is fixed, with a plate against it, *c*, so as to form a pulley groove between, *d*, to which a cord is fastened, and about three inches further on the rod is fixed a third iron wheel, about six inches in diameter, and half an inch thick, *e*. This last wheel runs in an iron groove, *f*, which extends along the end rafter or end wall of the roof to be covered.

“The canvas or netting being sewed together of a sufficient size to cover the roof, one side of it is nailed to a slip of wood placed against the back wall, that is, along the upper ends of the sashes; the other side is nailed to the rod, *a*. When the canvas is rolled up, it is held in its place under a coping, *g*, by a ratchet, *h*, and when it is let down, the cord, *i*, of the roll is loosened with one hand, and the ratchet cord, *k*, pulled with the other, when the canvas unrolls with its own weight. The process of pulling it up again needs not be described. The most valuable part of the plan is, that the roll of canvas, throughout its whole length, winds up and lets down without a single wrinkle, notwithstanding the pulley-wheel is only on one side. This is owing to the weight of the rod, and its equal diameter throughout. By this plan a house 100 or 150 feet long, might be covered with two rolls, the two pulleys working at the two ends; but if it were thought necessary, the two rods might be joined in the middle, and by a little contrivance, the pulley and groove placed there, so as to work both of the rolls at once from the inside of the house, from the back shed, or from the front.”—*Gard. Mag.*

SHALLOT. See *Eschalot*.

SHANKING is the technical term for a gangrene which attacks the foot-stalks of grapes and the stems of cabbages which have vegetated through the winter. The shanking of the grape appears to be occasioned by the temperature of the soil being too much below that in which the branches are vegetating; and, consequently, the sup-

ply of sap to the grapes is too much diminished, and the parts which thus fail of support immediately begin to decay; this is an effect always the consequence of a diminished supply of sap, apparent either in the leaves, flower, or fruit. The disease, like every other putrefaction, does not advance rapidly unless there be much moisture in the atmosphere. Shankng never appears in the grape if the roots of the vine are within the house. Shankng in the cabbage arises from a very different cause, viz., the freezing of the stalk of the cabbage just where it comes in contact with the soil. The best preventive is dressing the soil with salt, about five bushels per acre, late in the autumn.

SILARP CEDAR. *Acacia oxycedrus* and *Juniperus oxycedrus*.

SHEARS are of various kinds, differing in form according to the purpose for which they are intended. *Hedge-shears* for clipping hedges are the most common.

Sliding Pruning Shears with a moveable centre so as to make a drawing cut when used as when the pruning knife is employed. See *Averruncator*.

The drawing shows the smaller size, used with one hand. See *Scissors*. The large size, which has wood handles, will, when employed with both hands, cut through a bough full three inches in circumference, with the greatest ease.



Verge Shears are merely the hedge shears set nearly at a right angle on long handles for the convenience of the gardener in clipping the sides of box edging, and the verge of grass plots.

Turf Shears are set also at an angle, but in a different direction for cutting the tops of edgings, and grass growing in corners unapproachable by the scythe.

SHEEP LAUREL. *Kalmia angustifolia*.

SHELLS. See *Animal Matters*.

SHELTER. See *Screen*.

SHEPHERDIA. Two species. Hardy deciduous trees. Layers. Peat and loam, or common soil.

SHEPHERD'S BEARD. *Arnopogon*.

SHEPHERD'S CLUB. *Verbascum Thapsus*.

SHIFTING. See *Potting* and *One-shift System*.

SHREDS for fastening trees to walls are best made of the list or selvaige torn from black or blue cloth, and may be obtained of any tailor. The smallest possible number of shreds, and the narrowest consistent with strength should be employed; for wherever the shred envelops the branch, the wood beneath is never so well ripened as those parts exposed to the light and air, which are so essential to enable the bark to assimilate and separate from the sap those secretions which are required for the next year's growth. Shreds should always be long enough to permit the ends to be doubled over, so that the nail may pass through four thicknesses of the cloth, otherwise they look ragged and are liable to tear away from the nail. If old shreds are re-used, they should be previously boiled for a few minutes to destroy any insect-eggs, or larvæ they may contain.

SHRIVELLING of the berries of the grape in stoves arises from the roots of the vine not supplying a sufficiency of sap. This occurs if the roots are in a cold heavy soil, or are vegetating in an outside border, the temperature of which is too low compared with that of the stove. In the first case, thorough draining and the incorporation of calcareous rubbish; and in the second case, protection to the border and stem, will remove the evil.

SHRUBBERY is a garden, or portion of a garden, devoted to the cultivation of shrubs. It is not necessary, as Mr. Glenny observes, "That there should be any flowers or borders to constitute a shrubbery, but there should be great taste in forming clumps, and grouping the various foliages and styles of growth. The groundwork in such a garden consists of gravel walks and lawn. If flowers be intermixed, or, which is very generally adopted, there be a space left all round the clumps to grow flowers in, it becomes a dressed or pleasure ground, rather than a shrubbery.— Though any part of a ground in which shrubs form the principal feature, is still called a shrubbery.— *Gard. and Prac. Flor.*

SHRUBS are trees of a dwarf growth, not exceeding in height twelve or fif-

teen feet, unless they are climbers, and having, if permitted, branches and foliage clothing the entire length of their stems.

SHUTERIA bicolor. Stove evergreen twiner. Seeds. Rich light loam.

SHUTTLECOCK. *Peripetera punicea*.

SIBBALDIA. Four species and some varieties. Hardy herbaceous perennials, or evergreen trailers. Division. Loam, peat and sand.

SIBERIAN CRAB. *Pyrus prunifolia*.

SIBERIAN PEA TREE. *Cara-gana*.

SIBTHORPIA europæa. Hardy herbaceous creeper. Division. Peaty soil, and a moist situation.

SIDA. Sixteen species. Hardy annuals, biennials, and herbaceous perennials; and stove evergreen shrubs. Seeds. Rich soil. The shrubby kinds are also increased by cuttings.

SIDERITIS. Eighteen species. Hardy annuals and herbaceous perennials, and hardy, half-hardy and greenhouse evergreen shrubs. Cuttings, seeds, and division. Dry sand or chalk.

SIDERODENDRON triflorum. Stove evergreen tree. Cuttings. Loam, peat, and sand.

SIDESADDLE FLOWER. *Sarracenia*.

SIEGESBECKIA. Six species. Hardy annuals. Seeds. Common soil.

SIEVE. See *Measures*.

SIEVERIA. Seven species. Hardy herbaceous perennials. Seeds or division. Light soil.

SILENE. Catch Fly. One hundred and fifty-one species. Chiefly hardy annuals, biennials, and herbaceous perennials. Seeds. Light rich soil. The shrubby kinds increase by young cuttings also. A few are green-house biennials.

SILK COTTON TREE. *Bombax*.

SILK TREE. *Acacia Julibrissin*.

SELPHIUM. Three species. Hardy herbaceous perennials. Division. Common soil.

SILVER TREE. *Leucadendron sericeum*.

SIMABA. Two species. Stove evergreen shrubs. Ripe cuttings. Turfy loam and peat.

SINAPIS. Mustard. Six species. Chiefly hardy annuals. *S. frutescens* is a green-house evergreen shrub. *S. me-*

dicaulis a perennial. Seeds. Common soil.

SINNINGIA. Six species. Stove evergreen shrubs. Cuttings. Peat and loam.

SIPHOCAMPHYLUS. Four species. Stove and hardy evergreen shrubs. Cuttings. Light sandy soil.

SIREX gigas. This fly pierces the fir, and other growing timber, depositing its eggs in the alburnum. M. Kollar says that:—

“In the seventh week after the eggs are laid, the maggot has attained its full size, and then generally buries itself six inches deep in the wood, where it is transformed in a cavity into a pupa, covered with a thin transparent skin. It remains in this state a long time; and examples are given of the perfect insect only making its appearance when the wood has been cut up for useful purposes.”

SIR JOSEPH BANKS' PINE. *Araucaria imbricata*.

SISYMBRIUM millefolium. Greenhouse evergreen shrub. Cuttings. Light soil.

SISYRINCHIUM. Twenty-seven species. Hardy, half-hardy, greenhouse and stove herbaceous perennials. Seed, or offsets. Light soil.

SIUM. Two species. Hardy herbaceous perennials. Division or seeds. Moist soil.

SKIP-JACK. See *Elater*.

SKIRRET. *Siàm Sisarum*.

Propagation.—By Seed.—Sow at the end of March, or early in April, in drills one inch deep, and twelve inches apart. The seedlings will be up in five weeks. Weed and thin to twelve inches apart. In autumn, they will be fit for use like parsneps.

By Offsets.—Old roots throw off these in the spring, when they may be slipped off, and planted in rows a foot apart each way.

Soil.—A light loam is best, trenched, with a little manure dug in with the bottom spit.

To save Seed, let a few of the old roots run up in spring; they will flower in July, and ripen their seed in the autumn.

SKULL-CAP. *Scutellaria*.

SLIPPER PLANT. *Pedilanthus*.

SLIPPER WORT. See *Calceolaria*.

SLIPS are employed for increasing the number of an established variety or

species. In the woody kinds, the young shoots are slipped off from the sides of the branches, &c., with the thumb and finger, instead of cutting them off with a knife, but is more commonly practised to the lower ligneous plants, such as sage, southernwood, rosemary, rue, and lavender. The best season of the year for effecting the work is generally in spring and beginning of summer, though many sorts will grow if planted at almost any time of the year.

Select the young shoots, chiefly of but one year's growth, and in many sorts the shoots of the year will grow the most readily, even if planted the summer they are produced, especially the hard wooded kinds; but in the more soft wooded plants, the slips will also often readily grow when a year or two old, being careful always to choose the most robust shoots, situated on the outward part of the plants, from three to six, or eight, or ten inches long, slipping them off close to the branches. Clear off the lower leaves, then plant them two parts in the ground, giving occasional shade and water, if in summer, till properly rooted; and towards autumn transplant them where they are to remain.

Many shrubby plants growing into large branches from the root, such as roses, spicas, and raspberries, may be slipped quite to the bottom, into separate plants, each furnished with roots, and may be planted either in nursery rows, or at once where they are to remain.

Herbaceous plants may be slipped into many separate plants, and it is effected by slipping off the increased suckers, or offsets of the root; some sorts, by the offsets from the sides of the heads of the plants; and some few sorts by slips of their stocks or branches.

Slipping should generally be performed in the spring, or early part of autumn, which may be effected either by slipping the outside offsets with roots, as the plants stand in the ground, or, to perform it more effectually, you may take the whole plants up, and slip them into several separate parts, each slip being furnished also with roots, planting them, if small, in nursery rows a year, to gain strength; or such as are strong, may be planted at once in the borders, &c.—*Abercrombie*.

SLOANEA. Two species. Stove ever-

green trees. Ripe cuttings. Loam and peat.

SLOE TREE. *Prunus spinosa*.

SLUGS are of many species, and the smaller are much more injurious to the gardener than those of a larger size, because they are much less discernible, and their ravages being more gradual, are not at once detected. They are effectually destroyed by either salt or lime; and to secure its contact with their bodies, it is best first to water the soil where they harbour with lime water, in the evening, when they are coming out to feed, sprinkling the surface also with dry lime; and at the end of a week, applying a surface dressing of salt, at the rate of five bushels per acre. If cabbage leaves are spread upon the surface of land infested by slugs, they will resort to their under sides, and thus they may be trapped; but lime and salt are most efficacious. Lime-water may be poured over wall-trees infested with them, and they may be syringed with it as well as with water in which gas liquor has been mixed, about half a pint to a gallon. If lime be sprinkled along the top, and at the base of the wall, renewing it weekly, the slugs cannot get to the trees.

SMALL CARDAMOM. *Amomum cardamomum*.

SMALL LUPINE. *Lupinus nanus*.

SMALL MONARDA. *Pycnanthemum monardella*.

SMALL PALM. *Sabal Palmetto*.

SMALL PEPPERMINT. *Thymus Piperella*.

SMEATHMANNIA *laevigata*. Stove evergreen shrub. Half-ripened cuttings. Loam, peat, and sand.

SMILACINA. Nine species. Hardy herbaceous perennials. Division. Light soil.

SMITHIA. Three species. Stove trailing annuals. Seeds. Peat, sand, and loam.

SNAILS. See *Slugs*.

These marauders are said to be very fond of bran, and that they are readily trapped if this be put in heaps under flower pots, with one side propped up to admit them. The common garden snail, *Helix hortensis*, is thus noticed by Mr. Curtis:—

“Snails are said to be hermaphrodites, and, consequently, they are all capable of laying eggs; and there have

been found eighty in one heap. They are globular, whitish, shining, and not larger than swan-shot. If kept in a damp place, they readily hatch, at once becoming little, thin, transparent, and nearly colourless shells. In a short time, they increase to twice the size, even when they have had nothing to feed upon. They are then of a dark, ochreous colour, with three imperfect rings, composed of brownish dots and streaks, and a transverse line of the same colour next the pale lip or margin; and these spots seem to vary as the animal withdraws or extends itself, owing to the dark tints shining through the semi-transparent shell.

As the snail grows, it has the faculty of enlarging the shell, from its own secretions; and, when full grown, it is as large as a small plum. It is convoluted obliquely, striated of an ochreous colour, variegated with pitchy spots, giving it a marbled appearance, and forming two or three transverse bands; the lip is ochreous, the margin slightly reflexed, the under side is smooth and white, with a pinkish tint.

"There are various ways of reducing the numbers of this pest—the simplest is, by searching amongst the leaves of wall-fruit in April, when the snails first leave their winter quarters, to satisfy their long abstinence, and they continue feeding until August or September.

"To protect seedling plants, a thick dusting of lime and soot round the stem will keep the snails away in dry weather.

"In August, the eggs may be found at the roots of pot-herbs, in the cavities of muck heaps, at the rotten foot of paling, &c. These should be diligently sought for and destroyed; for they nearly all will hatch.

"Salt and urine are destructive to snails; but it is difficult to apply either to them with much advantage. Lime, soot, and wood ashes are excellent checks; but the first loses its efficacy as soon as it becomes wet, and even the dews of the evening will frequently exhaust its caustic properties. Cabbage leaves are not an invariable decoy for the old snails: young ones, however, are very fond of them, especially when wet and withering."—*Gard. Chron.*

SNAIL FLOWER. *Phaseolus caracalla*.

SNAKE GOURD. *Trichosanthes*.

SNAKE ROOT. *Aristolochia serpentaria*.

SNAPDRAGON. *Antirrhinum* and *Silene antirrhina*.

SNAP TREE. *Judicia hysopifolia*.

SNEEZEWORT. *Achillea Ptarmica*.

SNOW is one of the gardener's best shelters, and should never be removed from his out-door crops. It prevents heat from radiating from them; protects them from freezing, drying blasts; and, being a bad conductor of heat, thus prevents its escape from them. I have never known the surface of the earth, below a covering of snow, colder than 32°, even when the temperature of the air above has been 28°.—*Johnson's Principles of Gardening*.

SNOWBALL TREE. *Viburnum Opulus*.

SNOWBERRY. *Chiococca*.

SNOWDROP. *Anemone sylvestris*, and *Galanthus*.

SNOWDROP TREE. *Halesia*.

SNOWFLAKE. *Leucojum*.

SOAP-BOILERS' ASHES. See *Ashes*.

SOAPWORT. *Saponaria*.

SOBOLEWSKIA *lithophila*. Hardy annual. Seed. Common soil.

SOIL. However varying in the proportions, yet every soil is composed of silica, alumina, lime, magnesia, oxide of iron, salts, and animal and vegetable remains. The most important consideration is, what proportions those are which constitute a fertile soil?

The beau ideal of a fertile soil is one which contains such a proportion of decomposing matter and of moisture as to keep the crop growing upon it always supplied with food in a state fit for introsusception, yet not so superabundantly as to render the plants too luxuriant, if the object in view is the production of seed; but for the production of those plants whose foliage is the part in request, as spinach, or of edible bulbous roots, as onions, which have a small expanse of leaves, so as to be almost entirely dependent upon the soil for nourishment, there can scarcely be an excess of decomposed matter presented to their roots.

Spinach, on rich soils, will yield successive cuttings, the same as asparagus; the latter especially demands abundant applications of nourishment to its roots, since, like the onion, it has little foliage

and slightly fibrous roots, at the same time that, like the spinach, it has to afford repeated cuttings; and thus, requiring a repeated development of parts, it needs abundant food in its immediate neighbourhood. A soil with a just proportion of decomposing matter will be capable of absorbing moisture, during the droughts of summer, from the atmosphere; for the most fertile soils are always the most absorbent. Yet it must not be too retentive of moisture, which is the case in such soils as contain too much alumina; neither must it too easily part with moisture, a fault which is a characteristic of those soils which contain an excess of silica.

A subsoil of gravel, mixed with clay, is the best, if not abounding in oxide of iron; for clay alone retains the moisture, on the arable surface, in too great an excess; and sand or chalk, on the contrary, carries it away too rapidly. It is, however, evident, that to insure these desiderata in any soil, at all seasons, is impossible; and it is manifest that a soil that would do so in one climate would fail in another, if the mean annual temperature of them should differ, as well as the amount in inches of rain which fall during the same period. Thus, in the western parts of England, more than twice as much rain occurs as in the most eastern counties, or in the proportion of forty-two to nineteen; a soil in the east of England, for any given crop, therefore, may be richer and more tenacious than the soil required for it on the western coast.

Alumina, or clay, imparts tenacity to a soil when applied; silica, or sand, diminishes that power; whilst chalk and lime have an intermediate effect. They render heavy soils more friable, light soils more retentive. These simple facts are important; two neighbouring gardens, by an interchange of soils, being often rendered fertile, which before were in the extremes of tenacity and porosity.

From these statements it is evident that no universal standard or recipe can be given for the formation of a fertile soil; but a soil, the constituents of which approach in their proportions to those of the following, cannot be unproductive in any climate. It is a rich alluvial soil, which Mr. Sinclair, in his invaluable *Hortus Gramineus Woburn-*

ensis, gives as being the most fertile for the grasses:—

“Fine sand, 115; aluminous stones, 70; carbonate of lime, 23; decomposing animal and vegetable matter, 34; silica, 100; alumina, 28; oxide of iron, 13; sulphate of lime, 2; soluble vegetable and saline matter, 7; loss, 8; total 400.”

I have already stated what forms a fertile soil; it may be added, that, to constitute it eminently such, its earthy particles must be in a minute state of division; the more so the more fertile it will be.

In the above analysis 185 parts only were separable by sifting through a fine sieve; 215 parts were impalpable; whereas poorer soils will often have 300 parts coarse matter to every 100 of finely pulverized constituents.

In affording warmth to plants the earth is of considerable importance, and the power of accumulating and retaining heat varies as much in soils as the proportions of their constituents. Sir Humphrey Davy found that a rich black mould, containing one-fourth of vegetable matter, had its temperature increased in an hour, from 65° to 88° by exposure to the sunshine, whilst a chalk soil was heated only to 69° under similar circumstances. But the first, when removed into the shade, cooled in half an hour 15°; whereas the latter lost only 4°. This explains why the crops on light-colored tenacious soils are in general so much more backward in spring, but are retained longer in verdure, during autumn, than those on black light soils. The latter attain a genial warmth the more readily, but part from it with equal speed. Different plants affect different soils. Every gardener must have observed that there is scarcely a kitchen garden but has some particular crop which it sustains in luxuriance, far superior to any other garden in its neighborhood, or to any other crop that can be grown on it. A garden I once cultivated would not produce, without the preparation of an artificial soil, the common garden-cress (*Lepidium sativum*), whilst the raspberry was remarkably luxuriant; and we have seen that the composition of a soil has a main influence in these peculiarities. It is certain that a soil is often considered unproductive, and the unproductiveness attributed to some de-

ficiency in its staple, when, in truth, the defect arises from erroneous management.

I have before stated an instance of tap-rooted plants being produced, of superior size and form, by means of applying the manure deep below the surface. In another instance, some parsneps being of necessity sown in a poor soil, having turned in some manure by trenching full twelve inches deep, I would not allow any to be applied to the surface, but, at the time of thinning I set half the bed out at an average of twelve inches' distance between each plant, the other half at nine inches. When taken up for storing, the whole were alike perfectly fusiform; but those grown at twelve inches apart were the finest, as four and a half is to three. If manure had been applied to the surface, the fibrous roots, I calculated, would be multiplied at the expense of the caudex, to its much greater detriment than by making the few usually produced by this root extend in length, thus enlarging the circuit of their pasturage.

Again, a more silicious, darker colored soil should be employed for the growth of an early crop, of any given plant, than is required by the main crop; because such soil will more readily get rid of the superfluous moisture, and earlier acquire a genial warmth, two great desiderata for vegetation in spring. On the contrary, in autumn, for a late crop of peas, for instance, the soil should be more aluminous, that such moisture may be retained.

The quantity of soluble matter obtainable from a soil, at any one time, is very small, seldom exceeding a one-thousandth part of its weight; and even pure vegetable mould, the debris of entirely putrefied plants, was found by Saussure to yield only one-eleventh of soluble matter. This mould was too rich for horticultural purposes, peas and beans grown in it being too luxuriant; and they were more productive in a soil containing only one-twentieth of organic constituents dissolvable by water. Small in amount, however, as is the soluble constituents of the most fertile soils, they are necessary for the vigorous vegetation of plants; for when a soil is deprived of those constituents by frequent washings with boiling water, it is much less fertile than before. Lie-

big and others have most illogically concluded, from the smallness of the soluble extract contained in a soil, that it is of small importance, forgetting that as fast as it is taken by the roots of the crop, it is generated again by the decomposition of the animal and vegetable remains. This is one reason why fallowing is beneficial; easily decomposing matters have been exhausted by successive crops; and by a year's rest, and exposure to the putrefactive agency of the air, the more stubborn and more slowly decomposing exuvia have time to resolve into and accumulate soluble compounds in the soil.—*Princ. of Gard.*

SOJA hispida. Hardy annual. Seed. Common soil.

SOLANDRA. Five species. Stove evergreen climbers. Cuttings. Turfy loam and peat. *S. grandiflora.* Mr. J. Brown, gardener at Whittlebury Lodge, near Towcester, says that—

“After it attains to the height of from three to five feet, it must not be shifted, but allowed to remain in as small a pot as it will grow in until the roots become matted round the inside. Early in autumn keep it in a cool situation, and allow it to become perfectly dry, when the leaves will drop off. About the beginning of November, introduce it into heat, and force gently, supplying it plentifully with water when it begins to grow. Being thus excited for a short time, the plant grows freely, and produces blossom-buds on the young wood, and at the end of each shoot; these in January and February expand. As soon as it has done flowering, which is generally in March, the shoots are to be cut back, and the plant, being shifted, put into heat and encouraged to grow, stopping the young shoots frequently, to induce it to throw out laterals, and to keep it dwarfed. By this treatment it very often forms spurs similar to a pear or apple-tree, at the ends of which, after allowing the roots to become matted in the pot, giving it a rest, and keeping it dry and cool from August till November, blossoms are produced in abundance, upon its being put again into heat.”—*Gard. Chron.*

SOLANUM. One hundred and thirty-six species, and some varieties. Stove and green-house evergreen shrubs and annuals; hardy annuals, deciduous climbers, herbaceous, and a few tuber-

ous-rooted perennials. To this latter belongs *S. tuberosum*, the potato. The annuals are increased by seeds; the other species by seeds, cuttings, or tubers. Light rich soil suits them all.

SOLDANELLA. Seven species. Hardy or half-hardy herbaceous perennials. Seeds or division. Peat and loam.

SOLDEVILLA *setosa*. Hardy herbaceous perennial. Seed. Common soil.

SOLDIER-WOOD. *Inga purpurea*.

SOLIDAGO. Golden Rod. Sixty-seven species. Hardy herbaceous perennials, except *S. leucanthemifolia*, which is half-hardy, and *S. spuria*, a green-house evergreen. Division. Common soil.

SOLLYA. Three species. Green-house evergreen climbers. Cuttings. Loam and peat.

SOLOMON'S SEAL. *Convallaria*.

SOOT is the volatilized unconsumed portion of common coal. It is thus constituted:—

Charcoal	371
Salts of ammonia . . .	427
— potash and soda . .	24
Oxide of iron	50
Silica	65
Alumina	31
Sulphate of lime . . .	31
Carbonate of magnesia .	2

It is an excellent manure for peas, onions, carrots, and probably all garden crops. An excellent liquid manure is soot mixed with rain water, in the proportion of one tablespoonful of soot to a quart of water, for plants in pots; but for asparagus, peas, &c., six quarts of soot to a hogshead of water. It must never be applied to plants in a state of rest. It succeeds admirably with bulbs.—*Gard. Chron.*

SOPHORA. Fourteen species. Hardy herbaceous perennials and deciduous trees; stove and green-house evergreen shrubs and trees. The latter increase by cuttings, the former by division. *S. chinensis* and *S. japonica*, hardy deciduous trees; by layers or seeds. Light loamy soil.

SOPHRONITIS. Three species. Stove epiphytes. Division. Wood with a little moss on the roots.

SORINDEIA *madagascariensis*. Stove evergreen shrub. Cuttings. Loam and peat.

SOROCEPHALUS. Seven species.

Green-house evergreen shrubs. Ripe cuttings taken off at a joint. Turfy loam and sand.

SORRELS. These are *Oxalis Acetosella*, Wood Sorrel; *Rumex acetosa*, Garden Sorrel; *R. scutatus*, French or Roman Sorrel.

Soil and Situation.—They thrive best in any garden soil that tends to lightness rather than tenacity, and is not too poor. The situation must be open.

Propagation.—The rumexes are propagated by seed, and all of them by parting the roots, both which modes may be practised from the middle of February until the same period in May, and by the latter also in September and October. The finest plants are raised by seed, but those from portions of the roots are soonest in production.

The seed is best sown in drills, six or eight inches apart, and half an inch in depth. When two or three inches high, the seedlings must be thinned to three or four inches apart, and those removed, if required, pricked out at similar distances. In September or October, or in the March and April of the succeeding year, they may be removed into their final stations, in rows twelve inches apart, each way, or, if the French, eighteen inches. The only attention they require down to this state of their growth, is to be kept clear of weeds, and to have water given in moderate quantities after each removal, until established.

When divisions of the root are employed, they must be set at once where they are to remain, at the final distances above mentioned; and the same attention paid in weeding and watering them. Established plants must in a like manner be kept constantly free from weeds. In summer, as they run up to seed, the stalks must be cut down as often as is required, to encourage the production of leaves. In autumn and spring, the surface of the ground should be gently stirred, and in the former season, a little manure, or in preference, a similar proportion of decayed leaves, turned in. Some gardeners raise fresh seedlings annually, but a fresh plantation is seldom necessary oftener than every fourth year; before which, however, it must be made, if the plants dwindle or produce diminutive leaves.

To obtain Seed.—Some plants must not be gathered from, and allowed to run up unchecked. They flower in the course of June, July, and August, perfecting their seed in autumn. Wood-sorrel never produces seed. See *Oxalis*.

SORRELTREE. *Andromeda arborea*.

SOULANGIA. Twelve species. Green-house evergreen shrubs. Young cuttings. Sandy peat.

SOURSOP. *Anona muricata*.

SOUTHERNWOOD. *Artemisia arborea*.

SOUTH SEA TEA. *Ilex vomitoria*.

SOWERBEA *juncea*. Green-house herbaceous perennial. Division. Sandy loam and peat.

SOWING. See *Germination*. * In addition a few practical directions may be given. Let all sowing be done in drills. For small seeds, such as lettuce, cabbage, &c., the drills may be sunk by pressing the handle of the hoe into the freshly dug soil; but for larger seeds, as parsneps, beet, and onions, the drills must be struck with the hoe.

All sowing should be performed in dry weather, more particularly all early sowing in winter and spring; but in hot weather, in summer and autumn, it may often be eligible to take advantage of sowing immediately after a shower or moderate rain.

The drills being at some distance from one another, not only admit the sun, air, and rain more effectually to the plants, and give them a greater scope, than such as are sown broadcast, but admit more readily the hoe between the drills to cut down weeds and loosen the soil.

The general method of forming drills for the reception of seeds, is with a common drawing-hoe, sometimes with a large hoe, and sometimes a middling or small hoe, according to the size of the drill required, and size and nature of the seeds; drawing the drill sometimes with the corner of the hoe, especially for larger seeds, and sometimes with the edge of the hoe flatwise or horizontally; but large seeds, such as peas, kidney beans, many of the nut kinds, and other large seeds, both of trees, shrubs, and herbaceous plants, require a deep angular drill, drawn with the corner of the hoe, turning the face or edge close to the line, so draw the drill along with an angular bottom

evenly, the depth required, the earth remaining close along the side of the drill, ready for turning in again over the seeds; but where flat or shallow drills are required for smaller seeds, it may in many cases, be more eligible to draw the drill with the hoe flatwise, holding the edge in a horizontal position.

Bedding in Sowing.—In this method the ground being dug and formed in four or five feet wide beds with alleys, a spade width or more between bed and bed, and the earth being drawn off the top of the bed with a rake or spade, half an inch or an inch deep into the alleys, the seed is then sown all over the surface of the bed, which being done, the earth in the alleys is immediately drawn or cast over the bed, again covering the seeds the same depth, and the surface is raked smooth.

The method of bedding in sowing by sifting, is sometimes practised for very small or light seeds of a more delicate nature, that require a very light covering of earth when sown, so in order to bury them as shallow as possible, cover them in by sifting fine earth over them out of a wire sieve.—*Abercrombie*.

SOY. See *Soja*.

SPADE. This most important of the gardener's tools, varies in its form and size.

The Common Digging Spade is of the largest size, being generally from fourteen to sixteen inches long in the plate, and nine or ten broad, narrowing half an inch to the bottom.

The Middling Spade is about a foot long in the plate, and seven or eight inches broad, and is useful in digging any narrow compartments and between rows of small plants, also in flower-beds and borders; and in stirring and fresh earthing the surface of beds occasionally, between close placed plants of long standing; planting and transplanting many sorts, both in the ground and in the pots.

The Small Spade.—Size ten or twelve inches long in the plate, and five or six wide. It is convenient in pointing-up or slight digging, and fresh earthing the surface between close rows of small plants, in beds and borders, &c., where neither of the two former spades can be readily introduced; likewise in planting and potting many sorts of small plants, taking up small roots and for other light purposes. Proper garden

spades have the plate wholly of iron, not above a quarter of an inch thick upwards, growing gradually thinner from the middle downward, the tree or handle being generally of ash, about two feet and a half long and an inch and a half thick, with a firm open handle at top, formed out of the solid wood, just big enough to admit of taking ready hold, one hand at top and the other below, and with an iron rivet through it to prevent it splitting.

Semicircular or Scooped Spade, has the plate made semicircular like a garden trowel, and is very useful in taking up plants with balls of earth to preserve them more firmly about the roots.—*Abercrombie*.

Poster of Stourbridge, and Lyddon of Birmingham, make very improved spades, wearing with a good edge throughout.

SPANISH BROOM. *Sparcium junceum*.

SPANISH CRESS. *Lepidium cardamines*.

SPANISH ELM. *Cordia Geraschanthus*.

SPANISH GARLIC. See *Rocambole*.

SPANISH NUT. *Moraa Sisyrinchium*.

SPANISH VIPER'S GRASS. *Scorzonera*.

SPARAXIS. Ten species and some varieties. Green-house and half-hardy bulbous perennials. Offsets or seeds. Sandy loam and peat.

SPARMANNIA africana. Green-house evergreen tree. Cuttings. Loam and peat.

SPARROW WORT. *Erica passerina*.

SPARTIUM. Broom. Two species, and two varieties. Hardy deciduous shrubs. Seeds or cuttings. Common soil.

SPATALANTHIUS speciosus. Hardy bulbous perennial. Offsets. Sandy loam and peat.

SPATALLA. Nine species. Green-house evergreen shrubs. Seeds, ripe cuttings. Light sandy loam.

SPATHODEA. Eight species. Stove evergreen trees, shrubs, and climbers. Cuttings. Loam and peat.

SPATHOGLOTTIS fortunatus. Green-house tuber. Division. Sandy loam.

SPAWN is the white filamentous mat-

ter produced in the soil by mushrooms, and by which they are propagated. It is doubtful whether it arises from their seed, or whether it is a mass of underground runners. See *Mushroom*.

SPECKLINIA. Five species. Stove epiphytes. Division. Wood, with a little moss on the roots.

SPECULARIA. Six species, and a few varieties. Hardy annuals. Seeds.

SPERMACOCE. Five species. Hardy annuals and stove annuals and biennials. Seeds. Light soil.

SPERMANYRUM strictum. Green-house evergreen shrub. Cuttings. Loam and peat.

SPHACELE. Two species. Green-house evergreen shrubs. Cuttings. Light rich soil.

SPHÆRALCEA. Eight species. Green-house evergreen shrubs and herbaceous perennials; a few, hardy annuals; the latter increase by seeds, the others by cuttings. Rich soil.

SPHÆROLOBIUM. Two species. Green-house evergreen shrubs. Young cuttings. Loam and peat.

SPHÆROPHYSA caspica. Hardy herbaceous perennial. Seeds, common soil; it should be watered sometimes with salted water.

SPHÆROTEMA propinquum. Stove evergreen climber. Cuttings. Sandy peat and loam.

SPHÆROSTIGMA. Three species. Hardy annuals and biennials. Seeds. Common soil.

SPHAGNUM is a white spongy moss, found only in bogs, and used for growing orchidaceous plants, or covering the drainage in flower pots.

SPHENOGYNE. Ten species. Green-house evergreen shrubs, and green-house and hardy annuals; the latter increase by seeds, the former by cuttings. Loam and peat.

SPHINX. *S. tipuliformis*. Currant Sphinx is thus mentioned by Mr. Curtis:

“Towards the end of May, and in June, we see the beautiful little currant sphinx sporting in the morning and noonday sun, about the flowers of the Persian Lilac, the Common Syringa, and other plants; at this time the females also resort to the currant trees to deposit their eggs in the crevices of the twigs, and as soon as the larva emerges from its tiny shell, it penetrates to the centre to feed upon the pith, proceed-

ing downward until it has arrived at its full growth; it then changes to a pupa serrated with transverse short spines, which enable it to ascend to an opening previously prepared by the larva, from which the sphinx escapes, leaving the pupa case half protruding from the branch.

“The caterpillar is fleshy and whitish, with an obscure dorsal line: the head and four horny spots upon the first thoracic segment are bright brown; it has six pectoral, eight abdominal, and two anal feet, which are of a similar colour, and a few fine longish hairs are scattered over its body. The moth is of a brilliant chalybeon black, inclining to purple, which is beautifully contrasted with the golden wings encircling its body when glittering in the sunshine. The black currants appear to be the most subject to these attacks of the currant sphinx caterpillar, and the first indication of its presence is the withering of the leaves and branches.”—*Gard. Chron.*

SPIDER OPHRYS. *Ophrys aranifera*.

SPIDER WORT. *Tradescantia*.

SPIELMANNIA *africana*. Green-house evergreen shrub. Cuttings. Light rich soil.

SPIGELIA *anthelmia*, a stove annual, and *S. marilandica*, a hardy herbaceous perennial. Seeds and cuttings. Loam and peat.

SPINACH. *Spinacea oleracea*.

“The Spinage or Spinach has been long cultivated, and is supposed to have come originally from Western Asia. Its use is well known.

“The principal varieties are the round seeded Savoy-leaved and Prickly-seeded. The former is best for spring and summer use, the latter is preferred for autumn sowing, being considered hardier.

“It may be sown broad cast or in drills. When drilled, it is easier kept clean, and more readily gathered for use. The drills should be twelve inches apart, the plants four inches apart in the rows. If sown thicker, thin out when young, as wanted; leaving plants at proper distances. For spring and early summer use, sow early in spring, and occasionally afterward; for the early autumn supply, sow at close of summer, and for the main winter crops about middle of autumn. Before very

cold weather give a light covering of straw, cedar brush, or anything that will lay lightly, and partially protect it; otherwise the finest and most succulent leaves become discoloured by the frost.”—*Rural Reg.*

To obtain Seed.—A sowing of each variety may be made in February or March, according to the openness of the season, or of the round-leaved variety some plants of a regular crop may be allowed to run up in April or May; and of the triangular-leaved, some plants of the winter standing crops may be suffered to remain. Keep them clear of weeds. Spinach is diœcious, and many ignorant persons, perceiving some of the plants to have no appearance of bearing seed, advise these to be pulled up, but these are the male-bearing plants, without which the others would be unfruitful. If, however, they are very numerous, some of them may be removed with benefit to those that remain, care being taken that some are left in every part of the bed. When the seed is set the male plants may be entirely removed, which allows more room for the fruitful. When the seed is ripe, which is known by its beginning to shed, in July or August, the plants ought to be pulled up and laid to dry thoroughly on a cloth, previously to its being beaten out and stored.

SPIRÆA. Forty-one species and many varieties. Hardy deciduous shrubs or herbaceous perennials, a few are tuberous-rooted. Layers or young cuttings, and the herbaceous species by division. Peat and loam, or common soil.

SPIRALEPIS. Four species. Green-house herbaceous perennials. *S. squarrosa*, an evergreen shrub. Seeds, cuttings, and division. Sandy peat and loam.

SPIRANTHERA *odoratissima*. Stove evergreen shrub. Half ripened cuttings. Sandy loam and peat.

SPIRANTHES. Four species. Stove green-house and half-hardy orchids. Division. Peat and loam.

SPIRONEMA *fragrans*. Stove herbaceous perennial. Division. Light rich loam.

SPONGE TREE. *Acacia farnesiana*.

SPOT, a disease occurring on the leaves of the pelargonium, is a dry gangrene, occasioned by an irregularity in the supply of moisture and vicissitudes

of temperature, but especially if one of the extremes is much below the degree of heat most favourable to the healthy growth of that plant. The reason of this is very obvious. If a pelargonium, or any other plant, be placed in a highly stimulating heat, and is abundantly supplied with root moisture, it immediately increases its surface of leaf to elaborate and digest the large amount of sap forwarded from the roots. If this amount of sap is subsequently suddenly reduced, by lowering the temperature and adding water to the soil less freely, the increased surface of leaf is no longer required, and it is a law pervading all the vegetable creation that the moment any of the parts of a plant are unnecessary to it, that moment it begins to decay. I placed a plant of the Marvel of Peru, or Heliotrope, in a high temperature and abundant moisture; these were then much reduced, and the leaves in a few days were completely decayed round their edges, and in spots upon their surfaces. The extent of leaf was accommodated to the amount of sap to be elaborated.—*Princ. of Gard.*

SPREKELIA *cybister* and its varieties. Stove bulbous perennials. Offsets. Sandy loam.

SPRENGELIA *incarnata*. Green-house evergreen shrub. Cuttings. Sandy peat.

SPRUE, a market name for the smallest sprouts of asparagus.

SPUR, is a lateral branch cut back, or shortened to a length of about two inches.

SPURGE LAUREL. *Daphne laureola*.

SPURLESS VIOLET. *Erpetion*.

SQUASH. *Cucurbita melopepo*. See *Gourd*.

STAAVIA. Three species. Green-house evergreen shrubs. Young cuttings. Sandy peat.

STACIYS. Thirty species. Hardy and green-house herbaceous perennials and evergreen shrubs, hardy annuals and biennials. The latter increase by seeds. The perennials by division, and the green-house species by cuttings. Common soil suits them all.

STACHYTARPHETA. Nine species. Stove or green-house annuals, biennials, herbaceous perennials, and evergreen shrubs. The latter increase by cuttings, the former by seeds. Light rich mould suits them all.

STACKHOUSIA *linariaefolia*. Green-house evergreen shrub. *S. monogyna*, hardy herbaceous perennial. Cuttings. Sandy loam and peat.

STADMANNIA *australis*. Green-house evergreen tree. Ripe cuttings, with the leaves on. Loam and peat.

STAFF TREE. *Celastrus*.

STALAGMITIS. Seven species. Stove evergreen trees. Cuttings. Turfy loam and peat. They require a strong heat.

STANDARD. A tree unsupported by a wall or trellis.

Full Standards are such trees as are trained with tall straight stems six or seven feet high, clear of branches, and are then suffered to branch out. All trees designed as full standards should be trained accordingly in their minor state, by trimming all lower laterals gradually as the stems advance in height, suffering the leader always to remain entire, especially in all forest trees; or if it should happen to fork, taking off the worst, and leaving the straightest shoot to run up, to continue the prolongation of the stem; and having thus run them up with clean stems six or seven feet in height, to force out laterals in that part to form a regular spreading head of but moderate height, for the greater convenience of gathering the fruit; but of forest tree standards never reduce the tops, but permit the leader to remain ever entire to run up in height, for the beauty and worth of such consists in their lofty stature. All fruit trees designed for full standards, are raised by grafting, &c., on the freest strong shooting stocks, and are trained with straight clean stems full five to six feet high, either the stock trained up to that stature, and so grafted or budded at the desired height, or the graft or bud is trained up for a stem to the height aforesaid, then suffered to send forth branches; observing in either method, it is to be considered whether you intend the tree shall form a spreading open head or assume a more erect and aspiring growth: in the former case, if you top the leading shoot of the graft or bud, at six or seven feet from the ground, it will force out lateral shoots at that height, and commence a spreading head open in the middle; suffering, however, the whole afterwards to take their own growth; and, in the second instance, that by permitting the leading shoot to

remain entire, it will rise in height, and the whole head will assume a more upright and lofty stature. In both methods the heads will afterwards naturally branch out abundantly, and furnish themselves sufficiently with bearing wood, producing fruit in two or three years from the grafting or budding; suffering them generally to take their own growth, without shortening, and very little other pruning, except the regulating any great irregularities.

Half Standards are trees trained with short stems only three or four feet high, then suffered to branch out at that height to form heads; having low heads the fruit is more easily gathered. *Concave* dwarfs have the middle hollow, and the branches all round in a cup form. *Horizontal* dwarfs, having the branches extended all round in a flat or horizontal position, but the concave dwarf is in most esteem.—*Abercrombie*.

STANHOPEA. Eleven species. Stove orchids. Division. Peat and potsherds.

STANLEYA *pinnatifida*. Hardy herbaceous perennial. Division or seeds. Vegetable mould.

STAPELIA. Thirty-three species. Green-house and stove evergreen shrubs; partly dried cuttings. Sandy loam and brick or lime rubbish.

STAR APPLE. *Chrysophyllum*.

STAR FISH. *Stapelia asterias*.

STAR OF BETHLEHEM. *Ornithogalum*.

STAR THISTLE. *Centaurea calcitrapa*.

STARWORT. *Aster*.

STATICE. Sea Lavender. Sixty-four species. The hardy herbaceous perennials increase by division or seeds. The green-house and half-hardy species by cuttings. Annuals and biennials by seeds. Sandy loam and peat.

S. Arborea, a green-house evergreen shrub.

“When practicable, this plant should be turned out in the border of a conservatory. It may, however, be grown to great perfection in a pot, if the roots are allowed plenty of room.

“The soil should consist of equal parts of turfy loam and peat, or vegetable mould.”—*Gard. Chron.*

STAUROCANTHUS *aphyllus*. Hardy evergreen shrub. Young cuttings or seeds. Peat and loam.

STEEPING. See *Germination*. It is

a very unfounded idea, that by steeping seeds in certain solutions the vigour and fecundity of the plants to which they give birth might be promoted. A certain degree of heat, oxygen gas, and water, are all the requisites for germination,—and until this process has commenced, no liquid but water at common temperatures will pass through the integuments of a seed. So soon as germination has commenced, this power to exclude foreign fluids ceases, but the organs starting into activity—the radicle and the plumule—are so delicate, that the weakest saline solutions are too acrid and offensive for them. So utterly incapable are the infant roots of imbibing such solutions, that at first they are absolutely dependent, themselves, for their very existence upon the seed-leaves, and if these are removed the plant either makes no further advance, or altogether perishes. Many years since I tried various menstrua to facilitate the germination of seeds, but, with the exception of those which promoted the decomposition of water, and the consequent more abundant evolution of oxygen, I found none of any efficiency. As to keeping the seeds in saline solutions until they germinated, I never, certainly, carried the experiments so far as that, and I shall be most astonished if any other effect than injury or death to the plant is the consequence. Such has been the result in the Horticultural Society's gardens, where the seeds of *Lupinus Hartwegii* were made to germinate in a weak solution of phosphate of ammonia.—*Johnson's Gardeners' Almanack*.

STENACTIS *speciosa*. Hardy herbaceous perennial. Division or seeds. Common soil.

STENANTHERA *pinifolia*. Green-house evergreen shrub. Cuttings. Very sandy peat and loam.

STENIA *pallida*. Stove epiphyte. Division. Wood, with a little moss on the roots.

STENOCARPUS *salignus*. Green-house evergreen shrub. Ripe cuttings. Sandy loam and peat.

STENOCHILUS. Five species. Green-house evergreen shrubs. Cuttings. Sandy loam and peat.

STENOMESSON. Three species. Stove or green-house bulbous perennials. Offsets. Sandy loam.

STEPHANIA *cleomoides*. Stove ever-

green shrub. Young cuttings. Loam, peat, and sand.

STEPHANOTIS floribunda. Stove climber. Cuttings. Light rich loam.

STEPTOCARPUS rexii. Mr. McIntyre, of Hillsborough, gives the following directions for the culture of this green-house evergreen:—

“The seed should be sown in the month of April, in pans, in a mixture of peat and loam; then place the pans in a hot-bed, frame or pit, until the plants are fit for potting off. The seed should be sown very thin; if not, the greater portion of the plants will rot off for want of air and room to their stalks, as they grow with their foliage prostrate. As soon as the plants are large enough for potting off, fill a quantity of pots with a mixture of leaf-mould, loam, and sand; place a plant in each pot, and give a little water.

“Afterwards remove them into the frame or pit; when they have got established in their pots, they may be removed to a cold frame or green-house.

“In June, they may be placed in the open air, and regularly watered during the summer.

“Towards the end of October, remove them to a frame, to protect them from frost. In May or June following they may be planted out where required. As soon as frost is apprehended, take up the plants, with a ball of earth attached to the roots, repot them and place them in a green-house or frame, till again required.”—*Gard. Chron.*

STERCULIA. Eighteen species. Stove evergreen trees and shrubs. Ripe cuttings, with the leaves left on. Light turfy or peaty loam.

STERIGMA. Two species. Hardy biennials. Seeds. Sandy loam.

STERILE is a term applied to unproductive land and flowers. For some observations on the first, see *Barren*. Sterile flowers are the male flowers on monoëcious and dioëcious plants. They occur on the cucumber, melon, gourd, asparagus, &c. They must not be destroyed, for without the pollen produced by their stamens, the fertile or female blossoms will not produce fruit. If plants are grown in too high a temperature, there is reason to believe they produce an excess of these sterile or male blossoms.

STERNBERGIA. Four species.

Hardy bulbous perennials. Offsets. Rich loam.

STEVENIA. Two species. Hardy annual and biennial. Seeds. Common soil.

STEVIA. Thirty-one species. Hardy, half-hardy, or green-house herbaceous perennials. Cuttings, divisions and seeds. Peat and loam.

STEWARTIA virginica. Hardy deciduous tree. Layers or ripe cuttings. Peat and loam.

STIFTIA insignis. Green-house deciduous shrub. Cuttings. Loam and peat.

STIGMAPHYLLO. Four species. Stove evergreen twiners. Cuttings. Peat and sandy loam.

STILAGO. Two species. Stove evergreen trees. Cuttings. Sandy loam and peat.

STITCHWORT. *Stellaria.*

STOBÆA pinnata. Green-house evergreen shrub. Young cuttings. Light rich soil.

STOCK. *Mathiola.* This genus was, until lately, united with the wall-flower, under the generic name *Cheiranthus*. Some of the following are species, but others only very distinct varieties.

M. acaulis. (Stemless Stock.) Hardy annual. Red. Flowers in June.

M. alpina. (Alpine Stock.) Hardy evergreen. Yellow. May.

M. annua. (Ten-week Stock.) Hardy annual. Various colours. August. Many varieties.

M. coronopifolia. Hardy biennial. Purple. June.

M. fenestralis. Hardy biennial. Purple. July.

M. glabrata. Half-hardy evergreen. White. August.

M. græca. Hardy annual. White. August.

M. helvetica. (Swiss Stock.) Hardy evergreen. Yellow. June.

M. incana. (Brompton and Twickenham Stock.) Hardy evergreen shrub. Crimson. August. Many varieties.

M. livida. Hardy annual. Purple. July.

M. longipetala. Hardy annual. Red. June.

M. maritima. (Virginia Stock.) Hardy annual. Red and white. June.

M. mutabilis. (Changeable Stock.) Green-house evergreen. Yellow and purple. May.

M. odoratissima. Green-house evergreen. Crimson. June.

M. oxyceras. Hardy annual. Crimson. July.

M. parviflora. Hardy annual. Purple. July.

M. purpurea. Half-hardy evergreen. Purple. August.

M. sicula. Hardy biennial. Lilac. July.

M. simplicicaulis. Hardy biennial. Purple or white. July.

M. sinuata. Hardy biennial. Red. July.

M. tartarica. Hardy biennial. Red or yellow. July.

M. tenella. (Five-leaved Stock.) Hardy annual. Brown. July.

M. tortuosa. Green-house evergreen. Purple. July.

M. tricuspidata. Hardy annual. Purple. July.

M. tristis, *M. varia*. (Night-smelling or Dark-flowered Stock.) Green-house evergreen. Crimson. June.

Sowing Annuals.—Best time, end of August, in pans filled with a soil of equal parts peat and loam, and placed in a cold frame; water frequently; when they have got six leaves prick singly into pots three inches and a half diameter, in same kind of soil. Keep in frames through the winter, and shelter from frost. Remove without disturbing the roots into beds and borders, at the end of May.

Spring sowings in May, June, and July, will succeed the autumn sown; if sown in a hot-bed during April, they will be nearly as forward as the autumn sown, but not bloom so strong.

Sowing Biennials.—This may be done in any moderately rich border in June; to be transplanted where they are to remain, when of a moderate size.

Cuttings may be planted in May, of any very good double variety, cutting them off with a portion of the stem's bark, in a shady border, watering, and covering with a hand-glass until established. Select robust shoots of the same year's growth; strip off the leaves from the bottom half of their length. Water frequently, and by September they will form dwarf bushy plants. I know of no means of promoting the production of double flowers, except applying abundance of liquid manure so soon as the flower buds appear. The

weakest seedlings are most likely to produce double flowers.

STOCK-GILLIFLOWER. See *Wall-flower*.

STOCKS are young trees or shrubs raised from seed, suckers, layers, and cuttings, for the reception of buds or grafts from other trees or shrubs of a kindred species.

Although the sap increases in specific gravity, and, consequently, obtains most accession of solid matter during its progress up the stem, yet the matter thus obtained is not of paramount importance, nor absolutely controlling the subsequent changes to be effected; for, in such case, the green-gage would be altered by its plum stock, and the nonpareil by its crab stem. So far from this being the case, the old gardener's maxim, 'the graft overruleth the stock quite,' is consonant with truth, though it is to be taken with some reservation. The graft prevails, and retains its qualities, yet the stock has the power of influencing its productiveness, as well as the quality of the fruit. Thus, a tree having an expansive foliage, and robust growth, indicative of large sap vessels, and vigorous circulation, should never be grafted upon a stock oppositely characterized, for the supply of sap will not be sufficient. Illustrations are afforded by the codlin never succeeding so well on a crab, nor a bigoureaux on a wild cherry, as they do on freer growing stocks. Indeed I have no doubt that every tree and shrub succeeds best, is most productive, and freest from disease, if it be supplied with sap from roots, and through a stem, of its own particular kind. This is evident to common sense; nor would any fruit scion be grafted upon a stock of another species or variety, if it were not that such stocks are most easily obtainable. For example, our choicest cherries are, for the reason assigned, grafted or budded upon the wild cherry; and every one must have noticed the frequently-occurring consequence, an enlargement, appearing like a wen, encircling the tree just above where the graft and the stock joined, the growth of the former having far outstripped that of the latter. If a tree could be nourished from its own roots, from organs assigned by its Creator, as those best suited to supply the most appropriate quantity and quality of sap, there can

be no doubt that it would be productive of benefit; and this desideratum seems to be secured by the plan suggested by M. Aibrett in the instances of apples and pears; and I see no reason forbidding its adoption to any other grafted tree. He recommends the grafts always to be inserted close to the surface of the ground, or they might be even rather below the surface, by scooping out the earth around the stems of the stocks. When planted out, the lowest extremity of the graft should be about four inches below the surface.

After two or three years, at the close of June, the soil should be removed, and just above the junction of the graft and stock, with a gouge, one fourth of the bark removed by four cuts on opposite sides of the stem.

“The cuts being deep enough to remove the inner bark, and the wounds covered immediately with rich soil, formed of one part putrescent cow-dung, and two parts maiden loam, if kept constantly moist with water, and occasionally with liquid manure, roots will usually be speedily emitted, especially if the place where a bud once was formed be thus kept moist beneath the soil.

But the stock has some other influence over the sap, besides limiting the quantity supplied to the scion, an influence not only arising from the size of its vessels, but upon its susceptibility to heat. It has a further influence over the scion, by the sap becoming more rich, indicated by its acquiring a greater specific gravity in some stocks than in others, during its upward progress. The specific gravity of the sap of a black cluster vine stock, on which a black Hamburgh had been grafted, was, when obtained six inches from the ground, 1003; and at five feet from the ground, 1006; but the same black Hamburgh, growing upon its own roots, had specific gravities at corresponding heights of 1004 and 1009.

This increase is of great importance to a tree's growth, when the quantity of sap passing annually through its vessels is considered. The exact amount of this it is, perhaps, impossible to discover; but its extent may be appreciated by the quantity of moisture their roots are known to imbibe, and by the facts that a small vine branch has poured out sixteen ounces of sap in twenty-four

hours; a birch tree, a quantity equal to its own weight, during the bleeding season; and a moderate sized maple, about two hundred pints, during the same period.

The habit of the stock, also, is of much more importance than is usually considered. If it grows more rapidly, or has larger sap vessels than the scion or bud, an enlargement occurs below these; but if they grow more rapidly than the stock, an enlargement takes place just above the point of union. In either case, the tree is usually rendered temporarily more prolific; but in the case where the stock grows more slowly, the productiveness is often of very short duration, the supply of sap annually becoming less and less sufficient to sustain the enlarged production of blossom and leaves. This very frequently occurs in the freer growing cherries, when inserted upon the wild species; and still more frequently to the peach and apricot upon stocks of the slow growing plums. It is highly important, therefore, to employ stocks, the growth of which is as nearly similar as may be to the parent of the buds or scion.

The earlier vegetation of the stock than of the bud or graft is also important; for, if these are earliest in development, they are apt to be exhausted and die before the flow of sap has enabled granulation and union between the faces of the wounds, at the junction, to occur. Mr. Knight's observations upon this point are the results of experience, and are so consonant with the suggestions of science, that I will quote them in his own words, without comment:—

“The practice of grafting the pear on the quince stock, and the peach and apricot on the plum, when extensive growth and durability are wanted, is wrong; but it is eligible whenever it is wished to diminish the vigour and growth of the tree, and where its durability is not thought important. The last remark applies chiefly to the Moorpark apricot, the abricot pêche, or abricot de Nancy, of the French.

“When great difficulty occurs in making a tree, whether fructiferous or ornamental, of any species or variety, produce blossoms, or in making its blossoms set when produced, success probably will be obtained by budding or grafting upon a stock nearly enough allied to the graft to preserve it alive

for a few years, but not permanently. The pear tree affords a stock of this kind to the apple, and I have had a heavy crop from a graft inserted in a tall pear stock, only twenty months previously, when every blossom of the same variety of fruit in the orchard was destroyed by frost. The fruit thus obtained was perfect externally, and possessed all its ordinary qualities; but the cores were black, without seed; and every blossom would have fallen abortively, if growing upon its native stock. The graft perished the winter following.

“My own experience induces me to think very highly of the excellence of the apricot stock for the peach or nectarine; but whenever that or the plum stock is employed, I am confident the bud cannot be inserted too near the ground, if vigorous and durable trees are required.

“The form and habit which a peach tree, of any given variety, is disposed to assume, is very much influenced by the kind of stock on which it is budded. If upon a plum or apricot stock, its stem will increase in size considerably as its base approaches the stock, and it will be much disposed to emit many lateral shoots, as always occurs in trees whose stems taper considerably upwards; consequently, such a tree will be more disposed to spread itself horizontally, than to ascend to the top of the wall, even when a single stem is suffered to stand perpendicularly. On the contrary, where a peach is budded upon a stock of some cultivated variety of its own species, the stock and the budded stem remain very nearly of the same size at the point of junction, as well as above and below. No obstacle is presented to the ascent or descent of the sap, which appears to rise more abundantly to the summit of the tree. It appears, also, to flow more freely into the slender branches, which have been the bearing wood of preceding years; and these extend, consequently, very widely compared with the bulk of the stock and large branches.

“When a stock of the same species with the graft or bud, but of a variety far less changed by cultivation, is employed, its effects are very nearly allied to those produced by a stock of another species or genus. Some think the stock influences the hardiness of the scion;

but I have ample reason to believe that this opinion is wholly erroneous, and this kind of hardiness in the root alone never can be a quality of any value in a stock, for the branches of every species of tree are much more easily destroyed by frost than its roots.

“Many believe also that a peach tree, when grafted upon its native stock, very soon perishes; but my experience does not further support this conclusion than that it proves seedling peach trees, when growing in a very rich soil, to be greatly injured, and often killed, by the excessive use of the pruning-knife upon their branches, when these are confined to too narrow limits. I think the stock, in this instance, can only act injuriously by supplying more nutriment than can be expended; for the root which nature gives to each seedling plant must be well, if not best, calculated for its support; and the chief general conclusions which experience has enabled me to draw safely are, that a stock of species or genus different from that of the fruit to be grafted upon it, can be used rarely with advantage, unless where the object of the planter is to restrain and debilitate; and where stocks of the same species with the bud or graft are used, it will be found advantageous, generally, to select such as approximate in their habits and state of change, or improvement from cultivation, those of the variety of fruit which they are intended to support.”

The only situation in which I can believe that the stock of another species can be advantageously employed, is where the soil happens to be unfriendly to the species from which the bud or scion is taken. This is justified by my observing that, in a garden so low lying as to be very subject to an overflow of water, the only pear trees which were at all productive were those grafted upon quince stocks, and the quince is well known to endure water much better than either the apple or pear.—*Princ. of Gard.*

Stocks for general use may be used for grafting or budding, when from the size of a good goosequill to half an inch, or not more than an inch in the part where the graft or bud is to be inserted. Stocks of two or three inches, or more, diameter, either the stems or branches, are also occasionally grafted

or budded with success, but are not proper for general practice.

Crab Stocks are all such as are raised from seeds, &c., of any wild ungrafted trees, particularly if the fruit-tree kind, such as the wild crab-apple of the woods and hedges, wild pears, plums, wild cherry, and of such other trees as have not been grafted or budded.

Free Stocks are such as are raised from the seed, layers, &c., of any of the cultivated varieties of fruit-trees, and others.

Paradise or *Doucin* stocks are raised from layers or suckers, from a dwarf variety of apple, the roots of which are produced nearer to the surface than those from crab stocks.

The *French Paradise* stock is distinguished from all others by its very dwarf growth, clear chestnut-coloured shoots, and small fibrous roots, which spread near the surface.

The *English Paradise* may be either referred to as the *Doucin* of the French or the *Dutch Paradise*; for in English nurseries, trees propagated on either are said to be on paradise stocks. Of these two, the *Doucin* has the darkest shoots. Their effects on the growth of the trees worked upon them are similar, being intermediate between the very dwarf habit induced by the French *Paradise*, and the luxuriant growth induced by the crab or free stocks.—*Gard. Chron.* See *Scion*, *Grafting*, and *Budding*.

STUEBE. Four species. Green-house evergreen shrubs. Young cuttings. Sandy loam and peat.

STOKESIA *cyanea*. Green-house herbaceous perennial. Seeds or division. Common soil.

STONECROP. *Sedum*.

STONE PINE. *Pinus Pinea*.

STOPPING is pinching or nipping off the extremity of a branch to prevent its further extension in length. It is frequently done either to promote its robustness, or to promote the production of laterals.

STORAX. *Styrax*.

STORK'S BILL. *Pelargonium*.

STOVES, as they are usually called in England, or hot-houses, as distinct from green-houses, are variously constructed in accordance with the habits of the plants for which they are intended. Those especially adapted to one tribe of plants will be particularly

described under the name of that tribe, as *Pine Apple*, *Orchidaceous Plants*, *Peach*, &c.

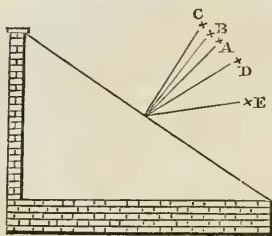
Before giving a plan of each general kind, a few observations may be prefixed applicable to all.

Glass.—This should be of the best manufacture, for just in proportion to its goodness of quality is the freedom with which the rays of light pass through, and a plant performs its digestive and assimilating processes the nearer to the vigour with which it effects them in a state of nature, just in proportion as the light it basks in is similar to that of its native habitat. But this is not the only reason why good glass should be employed in our garden structures; for whilst panes of common crown glass readily break from frost or the slightest twist of the wood-work, good sheet glass will remain uninjured by much greater violence and by the fiercest hailstorms. Some injury from the last, however, will always arise, and this leads me to observe, that no one having green-houses or stoves should fail to have them insured by the "Hailstorm Insurance Company." Good glass is of little value unless kept clean, and for this purpose it should be cleansed on both sides twice annually, early in February and October, and on the outside only in June.

The angle formed by the glass roof of the hot-house is of very considerable importance, because rays of light are reflected in proportion to the obliquity with which they fall upon any given surface: those which fall upon it perpendicularly from the source of light pass through with very slight diminution, but those falling upon it in a slanting or oblique direction are reduced in number in proportion to the obliquity of that direction. To ascertain how a glass roof may be constructed, so as to receive the greatest number of rays of light from the sun perpendicularly, or near to perpendicularity, at any given time of the year, it is necessary to know the latitude of the place where the hot-house is erected, and the sun's declination at the period when most light is required. The latter information may be obtained from most almanacks, and if it be subtracted from the latitude, the remainder will be the angle desired. If London be the place, and May the 6th the time about when the most light

is desired, the latitude being $51^{\circ} 31'$, and the sun's declension then $16^{\circ} 36'$ north, therefore the roof ought to slope at an angle of $34^{\circ} 55'$.

Fig. 157.



In latitude 52° , Mr. Knight found from lengthened experiments, that the best angle is about 34° , considering the services of a hot-house through the year, and to illustrate this, he gave the preceding diagram. About the middle of May, the elevation of the sun at noon corresponds nearly with the asterisk A; in the beginning of June and early in July it will be vertical at B, and at midsummer at C, only six degrees from being vertical. The asterisk D points out its position at the equinoxes, and E its position at midwinter. If the best glass be employed, it is an excellent plan to have it put double in each sash, an interval of half an inch being left between the two panes, and a small hole at the corner of the inner one to prevent the glass being broken by the expansion or contraction of the air between. This confined air is one of the worst possible conductors of heat, keeping the house from being rapidly cooled during the coldest weather, and thus is effected a very great economy of fuel, whilst little or no interruption is caused to the entrance of light.—*Princ. of Gard.*

Glazing, or the mode in which the glass is inserted in the frames, is a very important consideration; for if done imperfectly, moisture from rain, dew, or vapour condensed within the house penetrates between the rebate of the frame-work and the glass, or between the laps of the panes themselves, and expanding in the act of freezing unfailingly cracks them. Again, if the panes fit tightly into the rebates, any sudden expansion causes a similar fracture.

Mr. Seymour, gardener to the Countess of Bridgewater, at Ashridge Park, has these sensible remarks upon the subject:—

“There ought to be three or four sizes of panes used in horticultural structures; suppose, for example, the largest size for vineries, peach, and fig-houses; the next for pits for growing pines, melons, and cucumbers; a third size for frames; and the smallest for hand-glasses. If the sizes are so arranged, they will be found economical by the saving of glass. When there is a general repair going on with the hot-houses, the glazier ought to begin with that in which the largest sized panes are first, and work down to the smallest, and not, as is frequently the case, cut a large piece of glass away to replace a small one. In my opinion, there are no better sized panes for hot-houses than seven inches wide, by four and a half deep; for pits, by three inches deep; for frames, five and a half by two and a half inches deep, &c., with a lap of one-eighth of an inch. The glass should be clear, stout, and selected as flat as possible, so that the panes may lie perfectly level one upon the other, and so cut that they may not fit too tightly against the ribs, (which is frequently practised by some glaziers,) but room should be left for the ribs to swell and expand. Before a light is glazed, all the panes should be laid in loose, to see that they fit easy and are quite level, as well as range one with the other; when that is done, the panes must be taken out and some well worked putty laid in the rebate, the panes must then be replaced and pressed firmly down, and the bottom frame bedded in the putty, so as not to leave a vacancy. When the glass is bedded in the putty along the astragals, the usual way is to ‘front putty’ the whole at once; but at Kew, the lights are put by after the glass is bedded till the bedding putty is dry. The astragal then gets a coat of paint, and also a strip of the glass, the depth of the bedding on the astragal, and when this is dry the front putty is put on. The coat of paint on the glass will cause the front putty to adhere to the glass, and it will remain sound many years longer than when it is put on without this precaution. This is a capital contrivance for lights that slide up and down; but for lights that are fixed, the

best way is to have no front putty at all. Instead of overlapping the panes as is done in the ordinary way, I cause the glazier to cut each with a perfectly straight edge, and then to place them one before the other, so that they shall all fit exactly. When the light is completed, the surface of the glass is perfectly level, and there are no interstices in which the dust, &c., can accumulate, or for the deposit of moisture. By this means one cause of considerable breakage in frosty weather is entirely avoided; and if a pane of glass is accidentally broken, as each pane is independent of the others, the fracture does not extend beyond the single pane. The whole is very firm and compact, and the glass is not liable to shake out, as frequently occurs in opening and shutting sashes.”

—*Gard. Chron.*

Fig. 158.



If lapping be permitted, its width should not exceed one-eighth of an inch, and the panes should be acutely rhomboid, to throw the condensed vapour down to the lower corner, and induce it to trickle down the bars instead of dropping. It is very doubtful whether it reduces the amount of moisture taken between the laps by capillary attraction.

Flues are best built of bricks set on their edges, and the top formed of a shallow iron trough for the purpose of holding water, and thus keeping the air moist as required. At night, for retaining heat, pantiles may be placed along within the trough; the best form is the annexed.

Fig. 159.



Roof.—The framework of this may be of iron or of wood, and the comparative merits of the two materials are thus fairly stated by Dr. Lindley:—

“The advantages of iron roofs for hot-houses are, that they are more durable than wood, and allow a far greater quantity of light to pass through them than wooden roofs, the difference being as seven to twenty-eight, or even thirty, in favor of iron, and this is a

most important property, when we consider that the healthy action of plants is in proportion to the quantity of light which reaches them. The disadvantages of such roofs are, that they rapidly heat, and as quickly cool down; they are therefore liable to sudden changes of temperature, which can only be guarded against by great attention, which is expensive, and by a large consumption of fuel. We should say use iron, if you prefer success and beautiful form to cost, and can rely upon the attention of your people, but employ wood if you are obliged to study economy.”—*Gard. Chron.*

Heating.—Flues for imparting heat to hot-houses are for the most part superseded by either tanks or hot-water pipes; but where retained, the top should be formed of iron plates, these admitting the heat most readily into the house, and consequently requiring a less consumption of fuel. If it be desirable to have covering for the flues that will retain the heat longer, as when the fires are made up at night, this may be readily accomplished by putting a row of the thick square paving tiles on the top of the whole length of the flue, an hour or two before the houses are finally closed.

The power of retaining heat, or in other words of cooling slowly and gradually, which renders the covering of paving tiles desirable, renders the tank system of heating by hot-water still more efficient. It is a scientific operation throughout, and will be best appreciated by a reference to Mr. Rendle's diagram and description at page 500.

It is a law of fluids that their hottest portions rise to the surface of the containing vessel, and the coldest portions as invariably subside to the lowest surface, because heat makes them expand, and consequently diminishes their specific gravity; and the abstraction of heat makes them contract, and as consequently increase that gravity. When the boiler and tank are filled with water, as well as their connecting pipes, and a fire is lighted, the hottest portions rise to the top, flow along the surface, and getting cool, sink to its bottom, and passing downward enter again at the lower part, to be once more heated and pass through the same circulatory system. A very small boiler will speedily raise the heat of the water, in a very

large tank, to 180° ; and if this heat be imparted late in the evening, it will retain its heat but little diminished until the morning. The smoke, by means of a flue, may be made to impart heat to the house, by passing through it, or may at once enter the chimney or pipe attached to the summit of the boiler.

Hot water in a tank is superior to the same source of heat in pipes, because it is not liable to freeze; and it is preferable to steam, because its heating power continues until the whole mass of water is cooled down to the temperature of the house, whereas steam ceases to be generated as a source of heat the moment the temperature falls below 212° . If steam be employed, Mr. Tredgold has given the following rules for calculating the surface of pipe, the size of the boiler, the quantity of fuel, and the quantity of ventilation, required for a house thirty feet long, twelve feet wide, with the glass roof eight feet, length of the rafters fourteen feet, height of the back wall fifteen feet. The surface of glass in this house will be seven hundred and twenty feet superficial, viz., five hundred and forty feet in the front and roof, and one hundred and eighty feet in the ends. Now, half the vertical height, seven feet six inches, multiplied by the length in feet, and added to one and a half time the area of glass in feet, is equal to the cubic feet of air to be warmed in each minute when there are no double doors.

That is, $7.5 \times 30 + 1\frac{1}{2} \times 720 = 1305$ cubic feet. But in a house with wooden bars and rafters, about one-tenth of this space will be occupied with woodwork, which is so slow a conductor of heat, that it will not suffer a sensible quantity to escape, therefore 130 feet may be deducted, leaving the quantity to be warmed per minute $= 1175$ cubic feet.

To ascertain the surface of pipe required to warm any given quantity of air, multiply the cubic feet of air to be heated per minute, by the difference between the temperature the house is to be kept at, and that of the external air in degrees of Fahrenheit's thermometer, and divide the product by 2.1, the difference between 200, which is the temperature of the steam pipes, and the temperature of the house: the quotient will be the surface of cast iron pipe required.

Now in the house, the dimensions of which are above given, if the lowest temperature in the night be fixed at 50° , and 10° are allowed for winds, and the external air is supposed to be at zero or 0 of Fahrenheit, then 1175 multiplied by 60° , and the product divided by 2.1, the difference between 200 and 60, will give us the quotient $236 =$ to the surface of pipe required. Now the house being thirty feet long, five pipes of that length, and five inches in diameter, will be about the proper quantity.

If hot water be employed instead of steam, the following proportions and information, obtained from Mr. Rendle, may be adopted confidently as guides. In a span roof propagating house, forty feet long, thirteen feet broad, seven feet high in the centre, and four feet high at the two fronts, having a superficial surface of glass amounting to 538 square feet, Mr. Rendle has a tank eighty-three feet long, running round three sides of the house, four feet wide and about eight inches deep, and consequently capable of containing nearly 300 cubic feet of hot water, though only half that quantity is used. This is closely approaching to the size pointed out, according to Mr. Tredgold's formula. The mean temperature of a hot-water tank, will never be much above 100° , so that for the sized house mentioned by that skillful engineer, the divisor must be 2.1 times the difference between 100° and 60° , which gives as the quotient 335 cubic feet.

The tank in Mr. Rendle's propagating house, is built lined with Roman cement, and if the temperature at the time of lighting the fire be 90° , the temperature of the atmosphere of the house 67° , and the temperature out of doors 50° , the quantity of small coal or breeze required to raise the temperature of the water to 125° , is 28 pounds. In twelve hours, the water cools after the fire has been extinguished, from 125° to 93° .

When steam is employed, the space for steam in the boiler is easily found by multiplying the length of the pipe in feet, by the quantity of steam in a foot in length of the pipe.

Interior diameter of pipe in inches.	Decimal parts of a cubic foot of steam in each foot of pipe.
1	0.0545
$1\frac{1}{2}$	0.1225

2		0.2185
2½		0.34
3		0.49
4		0.873
5		1.063
6		1.964
7		2.67
8		3.49
9		4.42
10		5.45

In the above noticed house, the length of pipe five inches in diameter, is 150 feet; and these multiplied by 1.363 = 20.5 cubic feet of steam, and as the pipe will condense the steam of about one cubic foot and one-third of water per hour, therefore the boiler should be capable of evaporating 1½ cubic feet of water per hour, to allow for unavoidable loss. In the extreme case of the thermometer being at zero, the consumption of coals to keep up this evaporation will be 12½ pounds per hour.

These calculations are all founded upon the supposition that the condensed water is returned to the boiler whilst hot; but if this cannot be effected, then one-twelfth more fuel will be required. The boiler for the supply either of steam or hot-water, should be covered with the best available non-conductor of heat, and this is either charcoal or sand.

A case of brickwork, with pulverized charcoal, between this and the boiler, is to be preferred to any other. A boiler having a surface of seventy feet exposed to the air, in a temperature of 32°, requires an extra bushel of coals to be consumed per day, to compensate for the heat radiated and conducted from that surface; and the smaller the boiler, the greater is the proportionate waste. The surface of the pipes should be painted black, because a surface of this colour gives out more heat in a given time than any other.—*Prin. of Gardening.*

Ventilation.—The accumulation of gaseous matters, such as sulphurous acid and ammonia, and the consumption of carbonic acid, render ventilation essential to the health of plants in forcing-pits and hot-houses. They cannot inhale air overloaded with these contaminations, without being speedily injured, and the proportions of those gases which rapidly cause disease, or even death, are much less than the

gardener usually suspects; for if the sulphurous acid amounts to no more than one cubic foot in ten thousand of the air in a hot-house, it will destroy most of its inhabitants in two days. To avoid such destruction, for the comfort of visitors, and above all for the sake of the plants' vigour, air should be admitted as freely as the temperature will permit. The foul warm air can be easily allowed to escape through ventilators in the most elevated parts of the roof, and fresh warm air can be as readily supplied through pipes made to enter near the flooring of the house after passing through hot water, or other source of heat.

I am quite aware that Mr. Knight has stated that he paid little attention to ventilation, and that plants will be vigorous for a time in Wardian cases; but this does not prove that their Creator made a mistake when he placed vegetables in the open air.

Plants confined in houses or other close structures may be made to grow in spite of such confinement; but all experience proves that other favourable circumstances, such as heat, light, and moisture being equal, those plants are most vigorous and healthy which have the most liberal supply of air.

There have been many modes suggested for self-acting ventilators, descriptions of which may be found in London's *Encyclopædia of Gardening*, and the *Transactions of the London Horticultural Society*; but there are none that can supersede the gardener's personal care, directed by the thermometer and experience.

The practice of all ventilation is founded on the principle that the hottest air rises to the highest part of the house, and if there allowed to escape, colder air will come in below, if allowed, to supply its place. To prevent the hot air escaping too rapidly, the ventilators should be fitted with doors or caps, capable of regulating the size of the orifice; and the openings admitting fresh and colder from without, should have similar regulators, and be made by means of pipes passing through the bark-bed, tank of hot water, or other source of heat, so that the reduction of temperature be not too rapid.

Some guide in constructing ventilators proportioned to the size of the

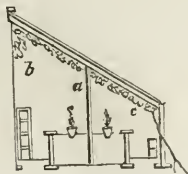
house to be ventilated, will be found in Mr. Hood's following table of the quantity of air, in cubic feet, discharged per minute, through a ventilator, of which the area is one square foot.

Height of ventilator in feet.	Difference between temperature of room and external air.					
	5°	10°	15°	20°	25°	30°
10	116	164	200	235	260	284
15	142	202	245	284	318	348
20	164	232	285	330	368	404
25	184	260	318	368	410	450
30	201	284	347	403	450	493
35	218	306	376	436	486	521
40	235	329	403	465	518	570
45	248	348	427	493	551	605
50	260	367	450	518	579	635

The foregoing table shows the discharge, through a ventilator of any height, and for any difference of temperature. Thus, suppose the height of the ventilator from the floor of the room to the extreme point of discharge to be thirty feet, and the difference between the temperature of the room and of the external air to be 15°, then the discharge through a ventilator one foot square, will be 347 cubic feet per minute. If the height be forty feet, and the difference of temperature 20°, then the discharge will be 465 cubic feet per minute.

Bark or Moist Stove.—Mr. Loudon gives the following design and description of a moist stove, warmed on the old plan of deriving heat by the combined agency of bark and flues. Instead of a stage in the centre it has a pit, which may be from two and a half to four feet deep, according as bark or leaves are to be used, the latter material requiring the greatest depth. It is

Fig. 160.

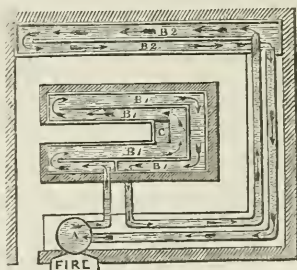


commonly surrounded by a thin brick wall: but planks of stone, or plates of slate or cast-iron, are to be preferred. The roof, when necessary, may be supported by iron columns from the middle of the pit, a.

"Shelves may be placed against the back wall, b, and occasionally a narrow-leaved creeper run up the roof, c. We may add, that houses of this description are generally placed east and west against walls, on account of the shelter thereby obtained during winter, when a high degree of heat is kept up within, while the cold is excessive without."—*Enc. of Gard.*

But the tank system is far superior to the foregoing; and the following detail, given by the Rev. John Huyshe, is so full of information upon the point, that I extract it entire from the *Gardener's Chronicle*:—

Fig. 161.



"A. is the boiler, its top level with the floor of the house, the fireplace being in a back shed. The boiler is small and conical; B 1 and B 2 are the tanks; c is a trap-door opening into the tank, to fill the house with steam at pleasure. The arrows indicate the course of the water through the tanks and pipes. The two pipes, though drawn side by side, are really one above the other; the return pipe being, of course, the lower. Above these pipes is a stone shelf. Tank B 1 is made of oak; the other, B 2, of elm. The wood of each is two inches and a half in thickness; and they stand on oak blocks, three inches thick, to raise them from the floor. This tends to prevent their decay, and promotes a freer circulation of hot air. The bottom boards are placed the lengthway

of the tank. The bottom, as well as the sides of the tanks, are bolted together by iron bars, five-eighths of an inch in thickness, passed through the wood, and screwed up as tightly as possible. Each tank is divided by an inch and a half elm board, and is covered with common roofing-slates—those that are generally called ‘Princesses,’ twenty-four inches long and fourteen wide; the edges not cut square, but used just as purchased, and the joints stopped merely with wetted clay: there is no fear of too much steam escaping into the house.

“As the divisions of tank B were fifteen inches wide, a small strip of oak is nailed on the inside of the tank, of sufficient thickness to allow the slates, which were fourteen inches wide, to reach across. Round the edges of the tanks is an inch board, eleven inches deep; and the plunging material is fine sand. The slates carry the weight of this sand, though eleven inches deep, with ease, not one of them having cracked.

“In a considerable part of tank B 1, rich mould is put instead of the sand, in which pines are planted without any pots, after the French mode. The tank holds twenty-two hogsheds; and the boiler, though a small one, is fully able to heat this quantity. The water, heated to 114° or 115° of Fahrenheit, is high enough to keep the house at a temperature of 70° at night; and a moderate fire, kept up for five or six hours

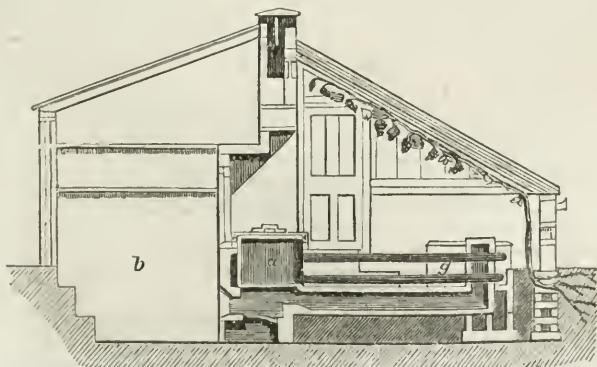
in the twenty-four, is abundantly sufficient.”—*Gard. Chron.*

Dry Stove.—Formerly this was heated by flues only, a stage for plants occupying the place of the bark-pit in the moist stove. But modern science has suggested the far better mode of heating by either steam or hot water. Of these two the latter is by far the most preferable. The following is the plan adopted at Elcot, and has never been much improved:—

“Brick flues are subject, from their numerous joints and the mortar cracking, to give out at times a sulphureous gas, which is injurious to plants; and even with two fireplaces in a house forty or fifty feet long, it is impossible to keep up an equal temperature in the whole length. The houses get overheated in the neighbourhood of the fireplace; and it is difficult to maintain a proper warmth at the extremities of the flues.

“Steam may do very well on a large scale, and where there is constant attention to the fire, both day and night; but the objections are, the great expense of a steam-boiler and the apparatus belonging to it, the frequent repairs that are required, and the necessary attention to the fire, which is as great upon a small scale as upon a large one. Besides this, there is a greater risk of explosion in a hot-house steam-boiler than in that of a steam-engine; for steam-engines generally have persons properly instructed to

Fig. 162.



manage them; but gardeners, or their assistants, cannot be so competent.

"The heating with hot water has none of the objections I have mentioned as belonging to flues and steam. The apparatus is simple, and not liable to get out of order. The boiler has only a loose wooden cover, and no safety-valves are required. The fuel consumed is very moderate, and when once the water is heated, very little attention is wanted; for it retains its heat for many hours after the fire has gone out.

"The house is forty feet long and ten feet wide inside, heated by a boiler, *a*, placed in a recess in the centre of the back wall; the fireplace under the wall is got at from a back shed, *b*. The boiler is two feet six inches long, one foot six inches wide, and one foot eight inches deep. From the end of the boiler proceed horizontally four cast-iron pipes of three inches and a half diameter; two of them are joined to the boiler just above the bottom, and the other two directly above these, and just below the surface of the water. The house is divided by glazed partitions into three compartments, *d*, *e*, *f*, for the convenience of forcing one part without the other.

"The middle compartment is two lights in width, and the other two have four lights each.

"The pipes from the boiler go horizontally to the front of the house, where one upper and one lower pipe branch to the east compartment, and other two pipes to the west, and are carried

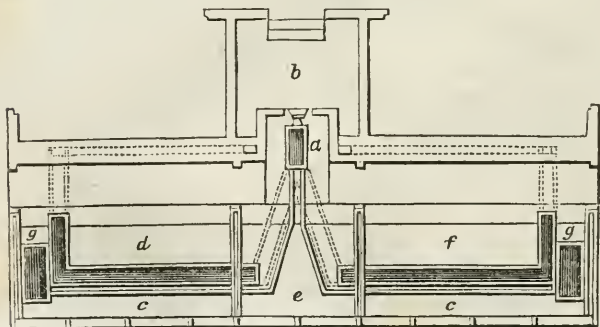
to the ends of the house along the sides of the flues, where they unite to cast-iron reservoirs at each end of the house, *g g*, which reservoirs are each three feet six inches long, one foot six inches wide, and one foot eight inches deep, having iron covers. These reservoirs are filled with water that communicates, by means of the pipes, with the water in the boiler.

"When the boiler, pipes, and reservoirs are filled, and a fire lighted under the boiler, the heated water, ascending to the top of the boiler, forces its way along the upper pipes to the reservoir, the cold water finding its way back to the bottom of the boiler through the under pipes; and the circulation continues regular as long as there is any heat under the boiler, the hot water flowing through the upper pipes to the reservoir, and, as it cools, returning back to the boiler through the under pipes.

"I have repeatedly, after the water has been heated, immersed a thermometer in the reservoirs at the ends of the house, and have only found a difference of three or four degrees between that and the water in the boiler. It is not necessary to make the water boil; and, if the fire is judiciously managed, no steam will be raised and no water wasted. It is, however, necessary to examine the boiler occasionally, and to add water when any has evaporated.

"Valves might be fixed in the boiler, pipes, and reservoirs, for letting steam into the house if required; but that would induce the necessity of boiling

Fig. 163.



the water; and it has not been done here, as I find I can produce all the steam I require, with little trouble, by wetting the pipes with a watering-pot.

"I am persuaded that the advantages of this mode of heating, with its great simplicity, will give satisfaction to every practical gardener who has an opportunity of trying it. When once the water is heated and the fires well made, he may retire to rest, certain that the pipes will not get cold during the night, but retain a considerable heat in the morning."—*Trans. Hort. Soc.*

STRANVÆSIA glaucescens. Hardy evergreen tree. Grafting or budding. Common soil.

STRAPWOOD. Corrigiola.

STRATIO TES aloides. Water Soldier. Hardy aquatic perennial. Suckers. Loam and peat.

STRAVADIUM. Three species. Stove evergreen trees. Layers. Sandy peat.

STRAWBERRY. Fragaria.

Species and Varieties.—*F. Virginiana*: Scarlet or Virginia Strawberry. American Scarlet; Bishop's Wick; Black Roseberry; Coul's Late Scarlet; Garnstone Scarlet; Grove End Scarlet; Melon; Old Scarlet; Roseberry; Southborough; and Wilmot's Late Scarlet.

F. Vesca Nigella: Black Strawberry. Downton; Elton; and Myatt's Pine.

F. Grandiflora: Pine Strawberry.—Myatt's British Queen; Myatt's Eliza; Keene's Seedling; Old Caroline, or Pine; Round White Caroline; and Swainstone's Seedling.

F. Chilensis: Chili Strawberry.—The Scarlet Chili, Yellow Chili, and Wilmot's Superb, are the only varieties of this class at all deserving cultivation; and even these are woolly and deficient in flavour.

F. Moschata: Hautboy Strawberry.—Black Hautbois, Common Hautbois; Large Flat; Prolifue, or Conical; and Round-fruited Muscatelle.

F. Collina Viridis: Green Strawberry.—Of this class the Green Pine, or Pine-apple, deserves culture; its fruit being solid, juicy, and fine-flavoured.

F. Collina Alba and Rubra: Alpine, or Monthly, and Wood Strawberry.—American Alpine; Red Alpine; Red Wood (*F. Vesca Rubra*); White Alpine; White Wood (*F. V. Alba*).

The following is a selection from the best of the preceding, in the order of

their ripening:—White Alpine; Old Scarlet; Grove End Scarlet; Keene's Seedling; Roseberry; Garnstone Scarlet; Myatt's Eliza; Old Pine; Myatt's British Queen; Large Flat Hautbois; American Scarlet; Downton; Elton; Coul's Late Scarlet; and Turner's Pine. The chief bearing-time of these is from the end of June to the middle of July; but the White Alpine produces successive crops until November. I have even gathered from them a dish late in December.

Soil and Situation.—Any good deep loamy soil will produce good strawberries. It should be well trenched and manured previously to planting. Though they will succeed when partially shaded by trees, yet they are best flavoured when grown in an open compartment, with no other shade than that from their own leaves. If Alpines are planted on south-west, east, and north borders, they will give a succession of fruit from June till December.

"Beds, four feet wide, should be marked out with a foot-alley between each, which is highly necessary to prevent those who gather the fruit from treading between the plants; and lastly, the runners are planted two feet apart. A bed thus made will last three years, without requiring anything further, not even so much as a top-dressing. Myatt's pine will grow profusely on light, rich, sandy, alluvial soils, near the sea. In such situations other strawberries are apt to throw out too many runners; and for such Myatt's plan is well adapted."—*Gard. Chron.*

Manures.—The best top-dressing for strawberry beds is a little leaf-mould, pointed in with a fork, early in March. A good addition also is nitrate of soda, three ounces to each square yard, sprinkled over the surface at the same season. Bone dust, and charred turf, pointed in with a fork, in October, have also been found highly beneficial.

Propagation.—This is chiefly by runners; but the Alpines are best propagated by seed. All other kinds can only be obtained true by planting the runners. The first of these should be pegged down as early as possible, and all others removed to promote the quick rooting and strength of the young plants.

"It is a very good plan to encourage the earliest runners by letting them

root in small pots sunk in the earth; as soon as they are well rooted, plant them in their beds."—*Gard. Chron.*

"The seeds of the true Alpine strawberry may be obtained from the Paris seedsmen. The seeds should be sown in a bed of light rich soil, or in pans, and the plants afterwards planted where they are to remain for fruiting, the soil being trenched, and well mixed with rotten dung. You may insure a more abundant crop late in the season by cutting off the blossoms that appear previously to June."—*Gard. Chron.*

Planting.—The best period for making strawberry beds is from the close of July until the middle of October—the earlier the better—but this must be controlled by the rooting of the runners. If the planting be deferred until spring, they never succeed so well, and the produce that year is very small. Showery weather is the best for planting, and the less the roots are disturbed the better, which is the chief reason why inducing the runners to root in small pots is beneficial; they can be turned out of these without any injury to the roots. Myatt's pines are more difficult to grow fruitfully than other varieties, but Mr. Mearns says they will not fail if the following precautions are adopted:—

"Take off the first runner plants as soon as they have rooted: the weather being showery is the more suitable for transplanting. Get a piece of well-exposed rich ground ready for their reception, according to the quantity desired, and let it be divided into four-feet beds. Plant them about four inches apart; water them, and shade them for a few days if the sun should be powerful, and keep them clear from weeds. Get a piece of ground prepared for their final transplanting, either in autumn or the following spring, by trenching and manuring it. Plant them eighteen inches row from row, and nine inches in the row; and if any blossoms appear the first season pinch them off, and keep them free from weeds; but it is not necessary to divest them of their runners until the following spring, when the beds are to be cleaned, and all runners cut off; but the soil should by no means be stirred between them any further than with a Dutch hoe, to loosen the surface lightly, and without destroying more of the surface-roots

than can possibly be avoided, as they are of great importance towards the success of the crop. Before the leaves cover too much of the surface, hoe gently amongst them to destroy all weeds, and afterwards cover the surface with clean straw. Take the first produced runners from them, and plant them in a nursery bed as in the previous season; and when the fruit is all gathered, destroy the old plants, and the ground will be then ready for cauliflowers, or any other crop required to be put out at that time. Myatt's pine will do little good by remaining a third season upon the same ground, however well manured; and this is generally applicable to hautboys, the Elton pine, Downton, and in fact to all strawberries."—*Gard. Chron.*

Beds.—"Never have more than three rows in a bed. Let them be eighteen inches apart, and the plants twelve inches apart in the rows; or two feet by eighteen inches, according to the richness of the soil, and vigorous growth of the variety. The pines require more room than the scarlets.

"Strawberries generally, but especially Myatt's pine, succeed best upon a bank facing the south-west.

"The old Hautboy strawberry bears the male and female flowers on different roots. The mode of planting is this: mark the male plant, the sterile, and plant the lines in quincunx thus—

: X : X : X : X :

the middle roots marked X to be the male plants, and the others the female. If this rule is observed, you will never fail to have abundance of fruit. The only time to mark the males is when they are in blossom; and every gardener should know them, and keep them apart in his nursery, to take young ones from."—*Gard. Chron.*

Dr. Lindley has these justly discriminating observations on the frequent renewal of the beds:—

"With regard to the opinion that a fresh plantation of strawberries should be made every year, to be destroyed after having once born fruit, and that the finest crops can only be obtained by this method, there are some doubts. Mr. Keene, the fortunate raiser of the seedling which bears his name, and an extensive cultivator, had a tolerable crop the first year, an excellent one the

second, and after the third year he destroyed the plantation. Those called Pine Strawberries, such as the Old Pine, Keene's Seedling, Elton, &c., will bear well in the same situation for many years, if properly managed.

"That scarlets are best when the plantations are frequently renewed, is generally admitted; and there are some large varieties which appear to have more or less of the Chili in their constitution, as Myatt's Seedlings, which require that runners be early established, for bearing in the following season, as the old plants are apt to die off. As fruit can be obtained earlier in the season from plants that have not previously borne, it is advisable to renew some portion every year; but the propriety of annually destroying the whole, depends very much on circumstances, and therefore the method cannot be recommended except in particular cases."—*Gard. Chron.*

The surface of the soil should be covered with straw, or the mowings of grass-plots, during the bearing season, to preserve moisture to the roots of the plants, and to keep the fruit from being dirt-splashed.

To promote an early produce of fruit, it is also suggested by Mr. G. L. Smartt, of Enfield,—that "there should be fixed on each side of the rows of strawberries, just before they come into blossom, feather-edged boards, at an angle of 50° or 55°. This may be effected by nailing two narrow slips of wood to each board, and pushing them into the ground. The boards should be painted black. This plan makes two or three weeks difference in the ripening of the fruit; but glass or an oiled paper frame being placed on the top, makes a greater difference still, and prevents any of the fruit from being trod upon, or eaten by vermin. This plan at first sight may appear to be an expensive one, but it is not so; any old boards will answer the purpose. I have bought old feather-edged boards at one half-penny per foot; and as they are only used in summer, they last for many years. The expense is saved in the first year; for the wood, although painted on each side with a coat of invisible green, costs only about three-halfpence the foot, while the increase of fruit in quantity, as well as in quality, quite compensates for the outlay."—*Gard. Chron.*

After-Culture.—"Remove all runners not required for planting as often as they appear, for their growth at first is at the expense of the parent, and the more beds are matted with plants, the more these will draw the moisture out of the soil.

"What would be just sufficient for supplying the evaporation of a moderate quantity of plants, would be completely exhausted by an excessive number. Stirring the soil so as not to injure the roots, mulching with grass or litter, or paving with flat tiles or small round pebbles and occasional waterings, are the best means to adopt.

"In thin soil the plantations will require to be more frequently renewed than where it is deeper, and of a more substantial quality."—*Gard. Chron.*

The spade should never be permitted to enter among strawberries, except to dig them up when a bed is to be destroyed; the hoe, or at the most pointing with a three-pronged fork, is all the surface-stirring required, if the beds were well trenched when made, and have not been trampled upon.

Late Crops.—"To obtain these of the Alpine, it is correctly recommended to sow the seed in pans, and place in a hot-bed about February, or not later than the first week in March. "When the plants are hardied off, plant out in good time in May; they will bear a plentiful crop in August and September following, and continue to bear until stopped by the frost. The same plants will also bear earlier than the larger sorts, and continue on until the crop raised from seed (as above) succeed, when they can be thrown away. Large stones, or tiles, or slates, placed between the plants, will keep the roots moist through the summer months, and ripen the fruit. Seed should always be saved from the finest fruit; to get them large and plentiful, waterings (with now and then manure water) will improve the size of the fruit."—*Gard. Chron.*

To obtain late crops of other strawberries, as of the Keene's Seedling, Mr. W. Godwin recommends—"plants which were early in spring to be planted out into a rich border, to remain until the last week of September, when they will throw up very strong spikes of flowers; take up and pot in the same soil in which they were growing, and place in a pine frame. They will bear

fruit to near the close of the year.”—*Gard. Chron.*

Forcing.—On this point we have the following directions from one of the most eminent of modern horticulturists, Mr. Paxton:—

“Select for this purpose, in the middle of August, a sufficient number of the best runners from approved kinds to have choice, from, and plant them six inches apart, in beds, upon a strong border in a dry and sheltered situation. As soon as the leaves have withered, mulch them lightly with well-rotted manure, and if very severe weather occur, protect them for the time with fern or litter. They must be kept the following spring free from weeds and runners, removing also any flowers as they appear. Towards the latter end of May or beginning of June, whenever dull or rainy weather may occur, remove them carefully into forty-eight-sized pots. It is optional with the grower, whether one, two, or three plants are put in one pot, according to his object being quality or quantity; but we, desiring fine fruit in preference to number, only place one of the strongest or two of the weaker in one pot, using enriched melon soil or turfy loam. Place them, when potted, in a situation where they can be readily shaded for a short time, and receive regular supplies of water if necessary. About the latter end of July, or early in August, these pots will be filled with roots, when the plants must be repotted into flat thirty-two-sized pots, usually termed strawberry pots, and at this time plunged in old tan or coal ashes. The best manner of plunging them we find to be, forming beds wide enough to contain five rows of pots, when plunged, upon a hard or gravelly surface, to prevent them rooting through, the sides supported by slabs of the same width as the depth of the pots, and filling them up with old tan or ashes; the plants remain here until wanted to take in, and are easily protected from severe frosts. It will be found an excellent plan to preserve the latest forced plants, which are not much exhausted, for forcing the first the next season; these, from their long period of rest, and well-ripened buds, are predisposed to break earlier and stronger than the others; some of them, if the autumn is moist, will be excited, and produce flowers, which

must be immediately pinched out; they should have their balls carefully reduced, and be repotted in larger pots early in August, protecting them from the late autumnal rains, and from frost.”

—*Gard. Chron.*

“For succession,” Mr. Paxton says, “strong runners are taken up in September, and planted about six inches apart, in manured and well-prepared beds, four feet wide, in a somewhat sheltered situation; there they are allowed to remain until the following July, during which period they must be kept very clean from weeds, have the flowers and runners regularly pinched off, and be watered whenever likely to suffer from drought. About the middle of July they are potted in small thirty-two-sized pots, two plants in a pot, taking the greatest care that neither roots nor leaves are damaged in the operation, and an important part of it is to press the earth firmly about them; the soil used is two parts loam to one of well-rotted dung. Beds which will hold five or six rows of pots are then formed in the following manner:—level the surface of the ground, and spread upon it a layer of coal ashes; above which must be nailed firmly slabs, or any rough boards, as wide as the depth of the pots, which are then to be plunged to the rim in spent bark or ashes. All that they will here require is attention to watering when necessary, and a slight protection with fern, or other light covering, during severe frosty weather. I always preserve from 300 to 400 of the latest forced plants of the above description, and after having carefully reduced their balls, repot them in large thirty-two-sized pots in July, treating them afterwards precisely as the others. I find these by having their buds formed early (through the slight forcing they have received), and becoming very strong, are admirably adapted for the first crop, and always repay me for the extra trouble. Begin forcing with a temperature of 40°, increasing to 50° when in bloom, and to 55° when ripening.”—*Gard. Chron.*

Mr. Brown, gardener to Lord Southampton, at Whittlebury Lodge, near Towcester, says, that “Mr. Paxton’s method of preparing strawberry plants for forcing is a good one where time and trouble are of no consequence; but for the last fifteen years he has adopted

a plan which answers well, and by which good strong plants are procured in one month from the present year's runners.

"The compost used is good strong loam, well mixed with rotten dung from the hot-bed linings; twenty-four-sized pots are the best for Keene's Seedlings, and thirty-twos for Grove End Scarlets. The latter variety answers for early forcing better than any other sort, when strawberries are wanted by the end of March.

"Having filled the pots with the compost, they are removed at once to the strawberry quarters, and arranged on each side of the rows, amongst the runners. The middle of July, when the plants are emitting roots, is the proper time to begin the operation of layering; having previously prepared a quantity of pegs, the runners that are rooted into the ground are carefully removed, and their roots inserted in the pots, and pegged down. Put three plants into the twenty-four pots, and one in the thirty-twos; they immediately begin growing, being supported by the mother plant, and will only require occasional watering in dry weather.

"When the plants are well rooted, which is in about one month, detach them from the old plants, and remove to their winter quarters.

"Beds are prepared for them with a bottom of coal ashes, and they are plunged in old tan; each bed surrounded with a stratum of coal ashes six inches wide, and as high as the top of the pots, which prevents worms from working amongst them."—*Gard. Chron.*

Thus far we have copied the English edition of this work. The American reader, though he will find that which will instruct in the culture of this delicious fruit, will perceive there is too much detail and tedious labour for his practice.

Many of the varieties named in the preceding article are comparatively unknown in this country, and others have been tested, and found wanting. Our American Seedlings have, on the whole, given most satisfaction, and are most reliable, whilst the efforts now being made to produce varieties promise, from the success already attained, to give all that could be desired.

"The market gardeners around Philadelphia, who are successful cultivators

of the strawberry, plant both in spring and early in autumn; their method is to plant two rows about twelve inches apart, and the plants twelve inches from each other in the rows; between every two rows as described, they leave spaces of two feet, which are, by the growth of the vines, reduced to one foot, thus making each bed two feet wide with an alley of twelve inches between them; when planted in the spring they usually raise some dwarf crop on the same ground, but that had better be omitted—keeping the soil cultivated and top-dressed with some well-rotted manure. In the autumn, they spread on the surface, both beds and alleys, a good coat of coarse manure, such as will lie lightly, the loose portion of which may be raked off in the spring, when the alleys are dug, and covered with straw, to exclude draught and screen the trusses of fruit on the edge of the bed from contact with the earth. Exhausted tanner's bark, or saw-dust scattered among the plants, is highly serviceable in protecting the fruit from grit.

"*Varieties.* HUDSON OR SCARLET.—This variety is grown almost exclusively for the supply of the Philadelphia market; it appears to be distinct from what is known as the old Hudson, in New York, which Downing describes as having a neck, whereas the Philadelphia Hudson has none, (unless occasionally spontaneous seedlings are found with elongated crowns.) It is undoubtedly one of the best, though from want of skill in its culture it is frequently unfruitful. The fruitful and barren flowers are on separate plants, and as the barren are most vigorous, they are liable to take nearly exclusive possession; in such cases the inevitable result is, but little fruit is obtained. The proper method is to carefully cull them when in flower, (the experienced can detect them by the foliage as well as flowers,) exterminating the larger portion of the male or stamiferous plants, as one in ten suffices to impregnate the pistiliferous or fruit-bearing flowers. Much has been said on this subject, and most positive denials of the fact here stated have been made, but after all it is incontrovertible, and remains a 'fixed fact.' Our limits will not admit of embarking further in the controversy, which has been practically settled around Philadelphia for fifty years, by the German truck women,

who may be seen in the spring, with their linsey petticoats and short-gowns, busily engaged plucking out the 'he plants,' as they term them.

"In France the Chili strawberry is highly esteemed, but as it requires foreign fertilization, they mix with it other varieties, and adopt artificial methods of impregnation. Duchesne has succeeded by cutting off the half-closed, or rather half-opened umbils of stamiferous flowers, with foot-stalks from one to three inches long, which being placed in phials filled with water, were distributed among the Chili plants; the next day the blossoms opened and the impregnation was successfully completed.

"Many experiments with like results, have been practised by others, and what in some of the periodicals is called 'Longworth's theory,' is nothing more than that of the Philadelphia truck-women, from one of whom that gentleman, as he says, received the hint.

"METHVEN SCARLET, also termed Keene's seedling (erroneously), is a very large variety, sometimes exceeding five inches in circumference; it is but indifferently flavoured, but much admired for preserving. The flowers of this variety are pistillate (female), though stamens are also present, generally in an imperfect state, hence it fruits more surely in company with those which have strong staminate flowers, as for instance the Iowa, or the males of the Hudson.

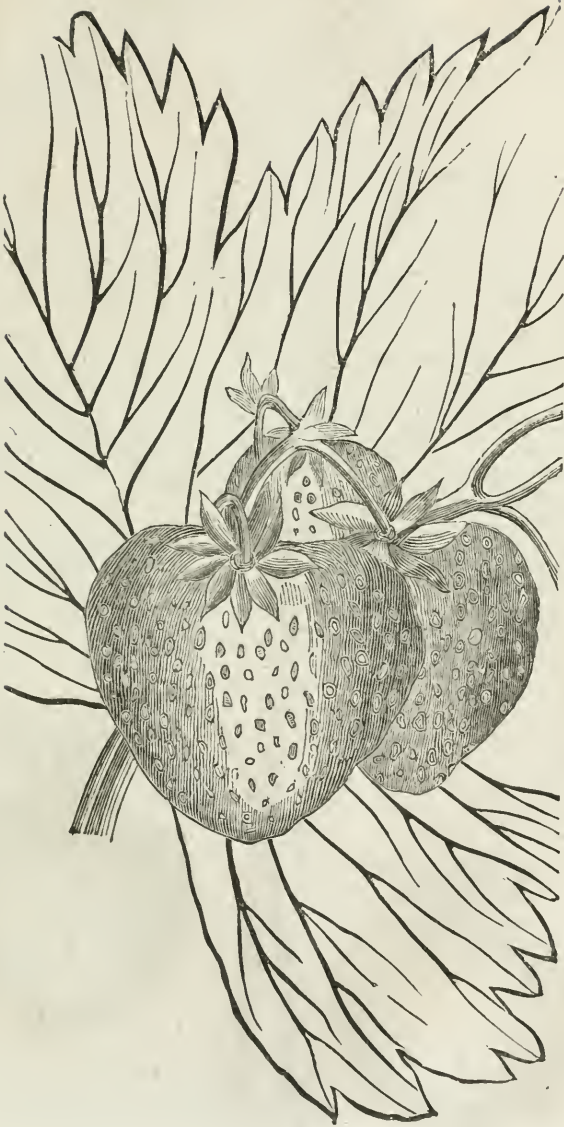
"HOVEY'S SEEDLING (Fig. 164) was raised from the seed by the Messrs. Hovey, of Boston, some years since, and is one of the most desirable strawberries among us. It is of vigorous growth, withstands the winter equal to any other, produces fruit of an enormous size, and exquisite flavour; too much cannot be said in its praise. Mode of cultivation same as others; it does not, however, always produce fruit when planted alone, from a deficiency of pollen in the anthers, and in an unfavourable state of the weather, fails to produce fruit at all: the better plan, therefore, is to mix with it some other variety, as directed for the Methven scarlet, or grow others in immediate contiguity, where the flies and air can affect the impregnation. It is true, fine crops from this variety are sometimes produced where no other variety is within a considerable distance, but it is attributable to most favourable states of

the weather, in which the scanty pollen is all available, and also to impregnation from seedlings, which are, more or less, in all beds of one year's standing, and some of which, proceeding from the old Hovey, have strong erect stamens, not unlike the Hudson males, with this difference, however, the pistil is fruitful and the fruit perfect.

"ROSS'S PHŒNIX.—This variety has been much praised in New York. It was produced by Mr. Alexander Ross, of Hudson, in that state, and from its character for hardiness and product (if true), would speedily attain popularity and general culture—unfortunately for its reputation it has suffered greatly by the past season's drought, whilst other varieties have sustained themselves uninjured. We must have further confirmation of its value, before recommending it for enlarged culture.

"CUSHING.—(Fig. 165.) This is one of a multitude of seedling strawberries, raised by that indefatigable amateur cultivator, Dr. Wm. C. Brincklé, of Philadelphia, to whom we are indebted for the drawing, Fig. 165, and many other favours. He thus describes it in an article communicated to the Farmers' Cabinet, vol. xi., No. 1.

"'Cushing, so named as a compliment to J. P. Cushing, Esq., of Boston, to whom I am under a thousand obligations—produced from a seed of a berry of No. 72, A., [Dr. B.'s private catalogue,] the anthers not having been extracted; planted May 31st, 1845; fruited in 1846, one year from the seed; flower large, with perfect anthers; leaf large and roundish, like that of Keene's Seedling and Ross's Phœnix; differing, however, from these two varieties, in having a hairy leaf stem, and when full grown, the leaf is slightly twisted; fruit very large, round, some of the berries with a short neck, light scarlet colour; seed inserted in slight depressions; fine flavour, and very productive. This plant was exhibited at one of the meetings of the Pennsylvania Horticultural Society this summer, with 26 fine berries on it, several of them four and a quarter inches in circumference. Not long since, Mr. Longworth, of Cincinnati, offered one hundred dollars for a strawberry with perfect anthers that will bear a full crop of fruit as large as Hovey's Seedling. Such a strawberry is, I think, the Cushing.'





"If Dr. Brincklé's opinion should be confirmed by further observation, he will have contributed an invaluable variety of this delicious fruit."—*Rural Register*.

STRAWBERRY BLITE. *Blitum*.

STRAWBERRY SPINACH. *Blitum*.

STRAWBERRY TREE. *Arbutus*.

STRELITZIA. Eight species. Stove herbaceous perennials. Suckers. Turfy loam.

STREPTANTHERA. Two species. Green-house bulbous perennials. Offsets. Loam and peat.

STREPTANTHIUS. Two species. Hardy annuals. Seeds. Common soil.

STREPTIUM *asperum*. Stove herbaceous perennial. Cuttings. Loam and peat.

STREPTOCARPUS *rexii*. Stove herbaceous perennial. Division. Rich soil and vegetable mould.

STREPTOPUS. Five species. Herbaceous perennials; all hardy except *S. simplex*, which belongs to the greenhouse. Seeds or division. Light soil.

STROBILANTHES *Sabiniana*. Stove evergreen shrub. Cuttings. Light rich soil.

STROPANTHUS. Three species. Stove evergreen shrubs. Cuttings. Sandy loam and peat.

STRUMARIA. Ten species. Green-house bulbous perennials. Offsets. Sandy loam.

STRUTHIOLA. Fifteen species. Green-house evergreen shrubs. Sandy peat.

STRUTHIOPTERIS. Two species. Ferns. Hardy herbaceous perennials. Division. Loam and peat.

STRYCHNOS. Six species. Stove evergreen trees. *S. colubrina* is a climber. Half-ripe cuttings and seeds. Loam and sandy peat. *Nux vomica* is one of the species.

STYLIDIUM. Nine species. Green-house herbaceous perennials or evergreen shrubs. The latter increases by cuttings, a few of the herbaceous by division, but chiefly by seeds. Sandy loam and peat suit them all.

STYPANDRA. Five species. Green-house herbaceous perennials. *S. frutescens* an evergreen shrub. Division. Sandy loam and peat.

STYPHELIA. Eight species. Green-house evergreen shrubs. Young cuttings. Sandy peat and sandy loam.

STYRAX. Four species. Hardy

deciduous shrubs. *S. officinale* produces the balsam of storax. Layers. Light soil.

SUCCORY, CHICORY, or WILD ENDIVE. *Cichorium intybus*. Although this hardy perennial plant is much used on the Continent in salads, yet it has never been employed to any extent for that purpose in Britain.

Soil and Situation.—Like endive, for the main crops it requires a rich light soil, and for the earlier sowings a moist-er one, in every instance having an open situation allotted to it.

Sowing must be annually; for, although it is a perennial, yet, after being cut from two or three times, the radical leaves become bitter and worthless. Mr. Oldaker says, it should be sown at the end of June, or early in July; but L'Quintiny recommends it to be performed in the beginning of March; and it may be performed, for successive crops, between the two periods mentioned by the above writers, in the same manner as endive, and also like that salad herb in small portions at a time, the earliest sowings being very liable to run to seed. Sow moderately thick, in the same manner as endive, the directions for cultivating which are equally applicable in every other particular.

Cultivation.—When the plants begin to cover the ground, they are thinned to nine inches apart; and those removed planted out at similar distances. They require to be kept very clear of weeds; and if the leaves grow very luxuriant, and shade the roots much, they must be cut off within an inch of the ground. Those grown from sowings antecedent to June, when of nearly full growth, which they arrive at in about four months from the insertion of the seed, must have all their leaves trimmed away, so as not to injure their hearts, and then covered over thick with sand, ashes, or long litter. By this treatment, those fresh leaves which are produced become etiolated and crisp, losing their bitterness. Those which arise from the sowings of June and July, must, at the end of September, or early in October, be raised, and planted very close, by the dibble, in pots or boxes, having their leaves trimmed as before directed, and their roots shortened previous to planting. Water must be given moderately in dry weather, until they are established, and shelter, if frosts occur, by a

light covering of litter. When well rooted they may be removed into the cellar, or other place, where the light can be completely excluded from them, to blanch for use as wanted, which change will be effected in six or seven days. Succory will bear a temperature of 60°, but thrives better in a rather lower one.

If the roots are vigorous, they will bear cutting from two or three times, after which they are unproductive.

To obtain Seed, a few plants must be left in the open ground of the June sowing; they bear the severity of winter without protection, and shoot up in the spring, running to seed about May.

SUCCOWIA balearica. Hardy annual. Seeds. Light soil.

SUCCULENT PLANTS are so characterized on account of their thick juicy leaves. "They are formed to exist," says that excellent botanist and horticulturist, Mr. Fortune, now traveling for the London Horticultural Society, "in countries and situations where they are often exposed to intense light and dryness; their skins are thick; they have few evaporating pores; and they have, likewise, few roots to gorge their tissue with food during the rainy season. Therefore, we find the dry sandy plains of the Cape abounding in aloes and mesembryanthemums; and the bare volcanic rocks of Mount Etna covered, in many places, with the common prickly pear. In Mexico, also, and in many other parts of Central and South America, the extensive race of cacti, with their curious unvegetable-like forms, are at home, and flourish even in those dry and parched seasons when the whole face of nature besides seems withered and destroyed. I wish particularly to draw attention to the natural circumstances in which these plants are found; because, if these are once known, they are sure and certain guides in cultivation.

"To be grown well, the whole race of what are called succulent plants require to be kept in the lightest possible situation in the green-house. It is true they may be grown in heavy-shaded green-houses, but their leaves will never acquire that beautiful colour which is seen in light situations, nor will they flower so freely. Water should be given to the slow-growing kinds at all times with a judicious hand, but par-

ticularly during winter, as more plants are killed by over-watering, than by any other cause. At this time, once in ten days or a fortnight will generally be found sufficient; but as this depends upon the situation and the weather, much must be left to the good sense of those who attend them. Those kinds which are more luxuriant in growth, and not so succulent, require more water, and are not so easily injured by it. By far the greatest number succeed perfectly, where the temperature is merely high enough to exclude frost, that is, anywhere between thirty-five and forty-five degrees, as may be most agreeable to the cultivator.

"Succulents are generally easily multiplied, either by seeds or cuttings. If the cutting is very soft, and liable to damp, it ought to be dried a little before it is put into the sand. Sometimes a little quicklime is useful for preventing decay, and can be either used for the base of the cutting, or to any part of the plant from which a damping piece has been removed."—*Gardeners' Chron.*

SUCKERS, says Dr. Lindley, in his *Theory of Horticulture*, "are branches naturally thrown up by a plant from its base, when the onward current of growth of the stem is stopped. Every stem, even the oldest, must have been once covered with leaves; each leaf had a bud in its axil; but of those buds, few are developed as branches, and the remainder remain latent, or perish. When the onward growth of a plant is arrested, the sap is driven to find new outlets, and then latent buds are very likely to be developed; in fact, when the whole plant is young, they must necessarily shoot forth under fitting circumstances; the well-known effect of cutting down a tree is an exemplification of this. Such branches, if they proceed from under ground, frequently form roots at their base, when they are employed as a means of propagation; and in the case of the pine-apple they are made use of for the same purpose, although they do not emit roots till they are separated from the parent. Gardeners usually satisfy themselves with taking from their pine-apple plants such suckers as are produced in consequence of the stoppage of onward growth by the formation of the fruits; but these are few in number, and not

at all what the plant is capable of yielding. Instead of throwing away the "stump" of the pine-apple, it should be placed in a damp pit, and exposed to a bottom heat of 90°, or thereabouts, when every one of the latent eyes will spring forth, and a crop of young plants be the result."

Taking up or transplanting suckers may be performed almost at any time, in open weather, from October to March, being careful to dig them up from the mother plant with as much root as possible, and cutting off any thick knobbed part of the old root that may adhere to the bottom, leaving only the fibres arising from the young wood. Though it is probable some will appear with hardly any fibres, they will be disposed to produce them after removal.

SUFFOCATION is a term employed by Keith and others to describe any stopping of the transpiratory organs of plants, whether it arises from extravasated sap, mosses, fungi, or even from a deficient supply of sap.

SUGAR BAKERS' REFUSE. See *Animal Matters*.

SUMACH. *Rhus*.

SUNFLOWER. *Helianthus*.

H. annuus. Annual Sunflower.

Soil and Situation.—A light rich soil, and as unshaded by trees as possible, suits it best. It is now much cultivated for its oil, and as a food for cattle and poultry. The following directions for its culture on a large scale, are applicable on a reduced extent for the garden:—

The earlier the seed can be got into the ground the better, say the beginning of April, as the crop will be ready to harvest the latter part of August, which will be of the greatest importance to growers. The necessary quantity of seed required for an acre depends upon the conditions of the soil, and varies from four pounds to five pounds; but, of course, it is advisable to sow a little more than is actually wanted, to provide against accidents. The seed should be drilled into the ground, and the distance from row to row eighteen inches; the plants to be thinned out to thirty inches from plant to plant, and the number of plants at this distance would be about 14,500 per acre; at eighteen inches from plant to plant, 25,000 per acre; and at twelve inches from plant to plant, 32,000. The produce of this

kind of grain, like that of most others, varies considerably, according to the state of the soil, climate and the cultivation that is employed; but the average quantity of seed is about fifty bushels per acre. This will produce fifty gallons of oil, and of oil-cake 1,500 pounds. The stalks, when burnt for alkali, give ten hundred weight of potash.

SUNFLOWER. *Actinotus Helianthi*.

SUN ROSE. *Helianthemum*.

SURFACE GRUBS, or caterpillars, are the larvæ of several species of *Noctua*, or Night Moths. Gardeners thus name them because they attack the roots of the turnip, mangold wurtzel, &c., just at the surface of the soil.

SUTHERLANDIA *frutescens*. Half-hardy evergreen shrub. Seeds or young cuttings. Peat and loam.

SUWARROW NUT. *Caryocar*.

SWAINSONIA. Three species. Green-house evergreen shrubs. Young cuttings or seeds. Sandy loam and peat.

SWALLOW WORT. *Asclepias*.

SWAMP LOCUST TREE. *Gleditschia monosperma*.

SWAMP POST. *Quercus lyrata*.

SWARTZIA. Three species. Stove evergreen shrubs. Cuttings with the leaves on. Sandy loam and peat.

SWEDISH BEAM TREE. *Pyrus intermedia*.

SWEDISH TURNIP. *Brassica campestris*; var. *rutabaga*.

SWEEPING. See *Broom*. It is best done in calm weather, and early, whilst the dew is strong enough to allay the dust and keep the light refuse from blowing about.

SWEET BAY. *Laurus nobilis*.

SWEET BRIAR. *Rosa rubiginosa*. It is of the easiest propagation in any common garden soil. Cuttings, suckers, and seed may be indifferently employed.

"To form a hedge of it sow the heps in the autumn as soon as ripe, or which is better, in the month of March, having kept them in the meanwhile mixed with sand. But it is far more convenient to buy sweet briar 'layers,' (young plants,) from the nurseryman, and to plant them a foot apart early in the month of November. Let them grow as they like for the first year, and cut them down to the ground the second; they will then spring up and require no more care than occasional trimming

with the pruning-knife or shears, so as to keep the hedge in shape. When it gets naked at the bottom it must be again cut down."—*Gard. Chron.*

SWEET CALABASH. *Passiflora maliformis*.

SWEET CICELY. See *Chervil*.

SWEETIA. Three species. Stove evergreen twiners. Cuttings or seeds. Loam and sand.

SWEET MARJORAM. *Origanum majorana*.

SWEET MAUDLIN. *Achillea ageratum*.

SWEET PEA. *Lathyrus odoratus*.

SWEET POTATOE. *Batata*.

SWEET SOP. *Anona squamosa*.

SWEET SULTAN. *Centaurea moschata*.

SWEET WILLIAM. *Dianthus barbatus*.

Varieties.—*Narrow-leaved kinds:* Deep Red; Pale Red; Pale Red and Flesh-coloured; Purplish, white-eyed; Snow White; White and Flesh-coloured; White and Purple; White Spotted; Red flowers and white borders, called Painted Lady Sweet-William, and many other intermediate shades of colours and variegations, and which frequently vary in the flowers of the same aggregate; there are also single and double flowers of each variety. Among the doubles of this class of narrow leaves, is that sort called the Mule, having a bright red double flower in smallish aggregates, said to have been accidentally produced from the seed of a Carnation impregnated by the Sweet-William.

Broad-leaved kinds:—Tall deep red; Tall flesh-coloured; Pure White; White dotted; Striped leaves and red flowers; Large double rose-coloured; Sweet scented; Large double deep purplish burster; Double variegated. All the varieties, about forty in number, are hardy herbaceous evergreen perennials, rising the first year with a large bushy tuft of leafy shoots, continuing green the year round, and the second year shooting up flower-stems, producing flowers in June and July, succeeded by abundance of seed in autumn. The plants, although usually of several years' duration, yet, after the first year of flowering, the shoots generally become long, straggling, and of dwindling growth, so that a supply should be raised every year from seed or layers.

Soil.—The best is a moderately rich

light loam on a dry subsoil. Leaf-mould and liquid manure the best additions.

Propagation.—They are propagated by seed, layers, and slips.

By Seed.—March and April is the season for sowing; sow it in a bed or border of light earth broadcast, and rake it in. In a fortnight the plants will come up. In June or July transplant into nursery beds of common earth, in rows six or eight inches distant, to remain until autumn or spring following, then to be taken up and planted in the places where they are to flower.

By Layers.—June and July is the proper season, and the same method is to be observed in every respect as for the *Carnation*. This is the only method of propagation to continue the same double-flowered varieties. Being layered, give frequent waterings in dry weather, and they will be well rooted in six or seven weeks, then to be separated from the old plant, and removed to a bed of light soil; and in October some of them should be potted to move to occasional shelter from frost, for although the doubles are almost as hardy as the single, yet being more choice, it is necessary always to have some that may have protection in severe winters, the same as for choice Carnations.

By Slips.—July is the best month for slipping; observing, if it is to be performed upon the year-old plants, they must be slipped quite down to the roots, so as to have fibres to each slip; plant them at once where they are to flower, but these never make such good plants as seedlings and layers, nor do they generally flower so strongly.

Saving Seed.—"The flowers which have the most beautiful colours, should, when in full bloom, be marked from which to have seed; if any ordinary sorts grow near them, let them be removed to prevent hybridizing. Let the branches of seed be gathered in dry weather, and after lying a few days in the sun be beaten out and stored till spring."—*Abercrombie*.

SWIETENIA. Two species. Stove evergreen trees. Ripe cuttings with the leaves on. Loam and sand.

SYMPHIANDBRA *pendula*. Hardy biennial. Seeds. Common soil.

SYMPHORICARPUS. *St. Peter's Wort*. Three species. Hardy decidu-

ous trees. Cuttings or suckers. Common soil.

SYMPHYTUM. Eight species. Hardy herbaceous or tuberous-rooted perennials. Division. Off-sets. Any soil suits them.

SYMPIEZIA capitellata. Green-house evergreen shrub. Young cuttings. Turfy peat and sand.

SYMPLOCOS. Three species. Green-house evergreen shrubs, or stove evergreen trees. Cuttings. Loam, peat and sand.

SYNCHRONICAL TIMES are validly observed for the performance of gardening operations. More than one botanist has observed that if the time of the foliation and blossoming of trees and herbs, and the days on which the seed is sown, flowers, and ripens, were noted, and if the observer continued these observations for many years, there can be no doubt but that we might find some rule from which we might conclude at what time grains and culinary plants, according to the nature of each soil, ought to be sown; nor should we be at a loss to guess at the approach of winter; nor ignorant whether we ought to make our autumn sowing later or earlier.

M. Barek would derive his intimations from the vegetable tribes alone, but, I think, the other kingdoms of organic nature might be included; as the appearances of certain migratory birds, and the birth of certain insects. For example, in the east of England, it is a common saying among gardeners, confirmed by practice—"When you have seen two swallows together, sow kidney beans."

Mr. Stillingfleet, one of the most careful of Nature's observers, says, that in his time "the prudent gardener never ventured to put his house-plants out until the mulberry leaf was of a certain growth."—*Gard. Alm.*

SYNNETIA. Three species. Green-house bulbous perennials. Offsets. Sandy peat and loam.

SYRINGA. *Lilac.* Five species and many varieties. Hardy deciduous shrubs. Seeds, layers, or suckers. Common soil.

SYRINGE. This is a most useful implement for impelling water over plants in pots, wall-trees, &c. Read's syringes are excellent. When the object is merely to refresh the plants, the

operator should stand at some distance from the plants, so that the water may spread and fall upon them like a shower. But if aphides have to be destroyed he may be closer to the plants, and drive forth the water with greater force.

SYZYGIIUM. Three species. Stove evergreen trees or shrubs. Cuttings. Sandy peat.

TABERNÆMONTANA. Fifteen species. Stove evergreen shrubs and trees. Cuttings. Loam, peat, and sand.

TACCA. Six species. Stove bulbous perennials. Division. Loam, peat, and sand.

TACHIA. Three species. Stove evergreen shrubs. Cuttings. Peat, sand, and loam.

TACHIGALIA bijuga. Stove evergreen tree. Cuttings. Light loam.

TACSONIA. Two species. Stove evergreen climbers. Cuttings. Loam and peat.

TÆRRITIS. Three species. Ferns. Stove evergreen creepers. Division or seeds. Sandy loam and peat.

TAGETES. Fifteen species. Hardy annuals, except *T. florida* and *T. lucida*, the first a half-hardy, the second a green-house herbaceous perennial. The annuals increase by seed, the others by cuttings or division. Light rich soil.

TALAUMA. Three species. Stove evergreen shrubs. Layers or inarching on *Magnolia obovata*, and ripe cuttings with the leaves on will root, but not easily. Loam, peat, and sand.

TALIERA bengalensis. Palm. Seeds. Turfy loam and sand.

TALIRIUM. Seven species. Stove and green-house evergreen shrubs and herbaceous perennials. Cuttings. Loam, peat, and sand. *T. reflexum*, a stove biennial, increases by seeds.

TALISIA guianensis. Stove evergreen shrub. Large cuttings with the leaves on. Turfy loam and peat.

TALLIES. See *Labels*.

TAMARINDUS. Tamarind. Two species. Stove evergreen trees. Seeds and cuttings. Sandy loam and peat.

TAMARIX. Three species. Stove evergreen shrubs or trees, except *T. gallica*, which is a hardy deciduous shrub. Cuttings. Any soil suits them.

Manna is produced from a variety of *T. gallicia*.

TAMONEA. Two species. Stove biennials. Seeds. Sandy soil.

TAN. See *Bark*.

TANACETUM. Tansy. Nine species. Hardy or green-house herbaceous perennials. The hardy kinds increase by division, the green-house by cuttings. Light rich soil. *T. globuliferum* a hardy annual. Seeds. Common soil.

TANGIER PEA. *Lathyrus tingitanus*.

TANK SYSTEM. See *Stove, Hot Water, and Rendle*.

TANSY. *Tanacetum vulgare*.

Varieties.—The Curled or Double Tansy, the one chiefly grown for culinary purposes; the Variegated; and the Common or Plain. This last is but of little worth, except for medicinal preparations.

Soil and Situation.—A light, dry, and rather poor soil, in an open exposure, is best suited to it, as in such it is the most hardy and aromatic.

Planting.—It is propagated by rooted slips, or divisions of its fibrous creeping root, planted from the close of February until that of May, as well as during the autumn. Established plants may be moved at any period of the year. Insert in rows twelve inches apart each way; a gentle watering being given, if the season is not showery. As the roots spread rapidly, plants will soon make their appearance over a large space of ground if left undisturbed; to prevent it, a path should be left entirely round the bed, and often dug up to keep them within bounds. The plants run up to seed during summer, but the stalks must be constantly removed, to encourage the production of young leaves. Weeds should be extirpated, and the decayed stalks cleared away in autumn, at the same time a little fresh mould being scattered over the bed.

Forcing.—If required during the winter and early spring, old undivided roots must be placed in a moderate hot-bed once a month, from the middle of November to the close of February. They may be planted in the earth of the bed, in pots, and plunged in a similar situation, or placed round the edges of the bark pits in a hot-house. A frame is not absolutely necessary, as a covering of mats supported on hoops, afforded during frost, at night, and in very inclement weather, will answer nearly as well.

TARCHONANTHUS. Two species.

Green-house evergreen shrub. Cuttings. Light rich soil.

TARRAGON. *Artemisia dracunculus*. Use it in salads to correct the coldness of the other herbs; and its leaves are likewise excellent when pickled.

Soil and Situation.—It will flourish in any that are poor and bleak. Indeed, a poor dry earth is essential to produce it in perfection as to flavour, and hardy.

Propagation by parting the roots, slips, and cuttings; as also by seed to be sown in the spring, but this mode is attended with much trouble. To have green Tarragon during the winter and spring, strong-rooted plants must be planted, small portions at a time, once or twice a month, from the close of October to the end of January. For the main crop, it may be planted any time from the end of February until the conclusion of May; and by cuttings of the young stalks, from the close of June until the same period of August; this last mode is not often adopted, on account of the uncertainty attending the rooting of the cuttings.

Cultivation.—The plants must be at least ten inches apart; and if dry weather, especially in the summer months, water must be given regularly every evening until they are rooted. They soon establish themselves, and may be gathered from the same year. As they run up, if seed is not required, the stems should be cut down, which causes them to shoot afresh. The only additional cultivation required is to keep them free from weeds.

At the end of autumn, if some established plants are set beneath a south fence, they will often afford leaves throughout the winter, or, at all events, come early in the spring. Some of the leaves should be gathered in the summer, and dried for winter's use.

To obtain Seed, it is only necessary to allow it to run up without molestation. It flowers about July, and when the seed is ripe, in early autumn, must be cut, and completely dried before it is beaten out.

TASMANNIA aromatica. Green-house shrub. Cuttings. Sandy loam and peat.

TAVERNIERA. Two species. Green-house evergreens; one a trailer, the other a shrub. Seeds. Sandy loam.

TAXODIUM capense. Green-house

evergreen shrub; and *T. distichum* (Deciduous Cypress), and its varieties, hardy deciduous trees. Seeds, layers, or cuttings with the leaves on, placed in water. Rich moist soil.

TAXUS. Yew Tree. Five species. Evergreen shrubs and trees, all hardy except *T. nucifera*, which belongs to the green-house. They increase chiefly by seeds, but may also increase by cuttings. Moist soil. See *Coniferae*.

TEA-TREE. *Thea*.

TECOMA. Fifteen species. Stove evergreen shrubs and trees. Green-house, hardy, and half-hardy evergreen and deciduous climbers. Cuttings and layers. Peat and loam, or common soil, and a warm situation.

TEEDIA. Two species. Green-house biennials. Cuttings or seeds. Light rich soil.

TEESDALIA. Two species. Hardy annuals. Seeds. Common soil.

TELEKIA *speciosa*. Hardy herbaceous perennial. Division. Common soil.

TELLIMA *grandiflora*. Hardy herbaceous perennial. Division. Peaty soil.

TELOPEA *speciosissima*. Warratah. Green-house evergreen tree. Layers and also cuttings. Sandy loam and heath mould.

TEMPERATURE is the most important circumstance connected with the cultivation of plants; for upon its proper regulation and just accommodation to the intensity of light depend, in the chief degree, whether a plant is healthy and capable of performing its functions. Every seed has its appropriate temperature for germinating (see *Germination*); every root has a temperature in which it imbibes food most favourably (see *Bottom-heat*); and every leaf has a temperature in which it respire most vigorously (see *Leaves and Night Temperature*).

TEMPLES dedicated to some deity of the heathen mythology, as to Pan in a grove, or to Flora among bright sunny parterres, are not inappropriate, if the extent of the grounds and the expenditure on their management allow them to be of that size, and of that correctness of style, which can alone give the classic air and dignity which are their only sources of pleasure.

TEMPLETONIA. Two species.

Green-house evergreen shrubs. Young cuttings. Sandy loam and peat.

TENTHREDO. Saw-fly. *T. moris*, Plum Saw-fly, attacks the green-gage, and other plums, when about the size of peas. It pierces them, causing their fall, to deposit its eggs in their pulp. M. Kollar gives these correct particulars of this insect:—

“At a distance it resembles a small house-fly; but it has four wings, whereas the house-fly has only two. The head and body are completely black, and the feet of a reddish yellow.

“It lays its eggs in the notched part of the calyx of the flowers, cuts in obliquely with its saws, without completely piercing it through, and introduces the egg into the deepest part, so that, when it flies away, nothing is seen on the exterior but two very small brown spots.

“The egg is very small, greenish-white, and transparent. It is hatched in the course of a few days, and produces a delicate whitish larva, with a dark-brown head, six pairs of middle feet, three pairs of fore feet, and one pair of anal feet.”

T. hamorrhoidalis, Pear Saw-fly, resembles the former, but is rather larger, and has more yellow about it. The same authority last quoted says that it “appears usually late in May, some of them only in June, if the warm spring weather sets in late. The female lays from forty to sixty eggs, and almost always on the under side of the leaf. The caterpillar, which is hatched in a few days, at first is of a whitish yellow, but becomes darker every day. As soon as it is exposed to the light, it spins a web over itself, the threads of which proceed from its mouth. The caterpillar never appears out of this web; and when it has partly eaten a leaf, it spins itself a web on another, and always in company with the other caterpillars. It has a black head, and, immediately under the throat, two black dots: the other parts of the body are ochre-colored and transparent, without hairs.”—Kollar.

T. difformis, Antler Rose Saw-fly. Its caterpillar feeds on the leaves of rose-trees; and they are thus described by Mr. Curtis:—

“They are nearly cylindrical, tapering a little to the tail. They are bright green, and covered with short upright hairs, with a darker line down the back,

and one of a deeper tint down each side. Having arrived at their full growth, they spin a web either between the contiguous leaves, or in a fold, by drawing the sides of a leaf slightly together; but sometimes it is attached to the stem only at a fork of the branches. In this web they form a yellowish-white cocoon, somewhat oval. In these cocoons the green larvæ rest a short time, losing, it is said, their fourteen false legs, and eventually changing to a pupa. The flies are hatched in twelve or thirteen days. The perfect insect is found from the end of May to the middle of August.

"It would not, perhaps, be an easy matter to get rid of these troublesome caterpillars, except by hand-picking and shaking the branches over a cloth; for, as they keep on the under surface of the leaves, no application except fumi-gating with sulphur would fairly reach them. It is possible that sprinkling hellebore powder over the leaves would annoy them."—*Gard. Chron.*

T. populi, Peach, or Poplar Saw-fly, also resembles the first-named, and M. Kollar says that,—

"As soon as the first leaves of the stone-fruits are unfolded in spring, this saw-fly visits them, and attacks the peach, apricot, and plum trees. They choose days that are particularly still and warm, and lay their eggs on a leaf in rows, one after another, from thirty to forty in number, not all at once, but often disburden themselves of their eggs at different times. They are longish, cylindrical, and of a light yellow color.

"If the weather is favorable the eggs are hatched in a few days, and a white-greenish grub is produced from them. They no sooner begin to move than they surround themselves with a web; thus surrounded they roam from one leaf to another, from which they select the best parts for their food; therefore a leaf is never found entirely consumed.

"As soon as they have attained their full growth they retire into the ground, form themselves a chamber, make themselves a dark-brown roomy case, the material for which they produce from themselves, and remain in the earth till spring, when they again appear as saw-flies to propagate their species."—*Kollar*.

T. grossulariæ and *T. ribesii* are

very destructive of gooseberries. Mr. Curtis says that,—

"The larvæ, of which there are two generations in the course of the year, live in societies consisting of from 50 to nearly 1000. One family, so to speak, frequently occupy one bush, and destroy all the leaves, thus preventing the fruit from arriving at maturity.

"The larvæ are of a grayish colour, covered with small black warts arranged in rows, and have twenty feet. Their transformation also takes place in society, one fixing the end of its cocoon to the end of the next, and so on. Many remedies have been suggested, but none have been attended with perfect success. Perhaps the surest way of all to diminish the numbers is to hand-pick the larvæ, and collect the cocoons wherever they appear, and destroy them, thus killing many hundreds in embryo."—*Gard. Chron.*

T. pini, *T. erythrocephala*, and *T. rufus*, infest the pine and fir species.

T. cerasi produces a slimy caterpillar, commonly called a slug-worm, very injurious to the leaf of the cherry, plum, and pear. Mr. Curtis observes of "these very singular and inactive caterpillars," that they "are more like little black slugs, or tadpoles, than the larvæ of a saw-fly, being entirely covered with a slimy matter which gives them a moist and shining appearance; and when at rest, upon the foliage, they might easily be mistaken for the droppings of sparrows or swallows. Upon closer examination they will be found to exhibit the typical characters of the family to which they belong, having six pectoral and fourteen abdominal feet, but no anal ones. They are of a deep bottle-green color; the thorax is dilated, being very much thicker than the rest of the body, and concealing the head, or nearly so.

"After four or five weeks, when they have arrived at their full growth, they cast off their bottle-green jackets, and then appear in a suit of buff, being entirely changed in their appearance; they no longer shine, neither are they smooth, but covered with small transverse wrinkles; and, a short time after, they leave the leaves for the purpose of entering the earth, where they spin an oval brown cocoon composed of silk, with grains of the soil adhering to the outside.

"Towards the end of July, after having lain dormant nearly ten months, the flies emerge from their tombs. The female is of a shining black, with a violet tint; the head and thorax are pubescent; the horns are short, pointed, and composed of nine joints; the ovipositor is nearly concealed; the wings are often more or less stained with black.

"The eggs are deposited on the upper side of the leaves, probably under the skin. They are oval, and of a clear yellow colour: the young larvæ are hatched from them in a few days. Dusting the infested trees with quicklime is certain death to the larvæ, especially in their earlier stages; but it ought to be repeated once or twice, as they change their skins, and can thus, like slugs, get rid of the noxious matter with their slough, for the first time, but not so at the second dusting. On a small scale, the powdered and unslaked lime might be scattered over the leaves with a tin box, having a number of holes in the lid like a dredging-box; and on a larger scale a fine sieve might be used by a man on a ladder or steps. Decoction of tobacco water, about a quarter of a pound of tobacco to two gallons of water, thrown over the trees with a garden-engine, will destroy them.

"Some persons have employed lime-water with complete success; about a peck of lime to thirty gallons of water; and if two pounds of soft soap be added, it will improve the mixture.

"The best periods for applying these liquids, are before seven in the morning and after five in the evening. The syringing should be repeated until the trees are free from the slug worm; they may afterwards be washed clean with pure water; and if the lime water be used in the evening the cleansing may be deferred until the following morning."—*Gard. Chron.*

TEPHRITIS onopordinis. Celery Fly. This insect causes blisters on the leaves of celery by puncturing them, and depositing its eggs within their tissue. Mr. Curtis observes that,—

"On examining these blisters they are found to be considerably inflated, and, on holding them up to the light, a maggot may be seen moving between the thin and somewhat transparent cuticles, where it has been consuming the parenchyma. Those parts of the

blisters where it commenced its operations being withered, they become ochreous or brown; and the other portions, but recently deprived of the pulpy substance, partake of a pale green tint. In this way one maggot will form a patch of more than an inch in diameter before it is full grown.

"The larvæ are of a glossy pale green, with the alimentary canal shining through the back; the head is attenuated, and the tail obtuse, with a few tubercles. The maggots leave their habitations and probably enter the earth to undergo their transformation to the pupa. The male flies are shining ochreous, with a few black bristles on the head and thorax, which are dark ochreous; the lower part of the face and horns is yellowish; the latter droop, and are furnished with a fine bristle or seta, which is black, except at the base. The eyes are deep green; the body, which is five-jointed, is rusty brown and downy; the wings are much longer than the body, iridescent, prettily variegated with brown, leaving two transparent spots on the costal edge, and five large irregular ones on the inferior margin. The female is larger and darker, especially the thorax, abdomen, and the brown markings on the wings."—*Gard. Chron.*

The blisters are most prevalent in September and October, and are occasionally found on those of the Alexander and Parsnep.

TEPIROSIA. Twenty-eight species. Stove and green-house evergreen shrubs, and a few herbaceous perennials of the latter species. *T. virginiana* is half hardy. Seeds or young cuttings. Loam and peat.

TERAMNUS. Two species. Stove evergreen twiners. Cuttings. Loam and peat.

TEREBRATION, or peg-grafting, is an obsolete mode, in which a hole was bored in the stock, and the scion was cut in a peg form to fit it. See *Grafting*.

TERMINALIA. Fifteen species. Stove evergreen trees and shrubs. Ripe cuttings. Loam and peat. From *T. catappa* the Indian ink is obtained.

TERNSTROMIA. Four species. Stove evergreen shrubs. Ripe cuttings. Loam and peat.

TERRACES are not permissible anywhere but around the mansion. Mr.

Whately justly observes, in connection with these structures, that,—

“Choice arrangement, composition, improvement, and preservation, are so many symptoms of art which may occasionally appear in several parts of a garden, but ought to be displayed without reserve near the house; nothing there should seem neglected; it is a scene of the most cultivated nature; it ought to be enriched—it ought to be adorned; and design may be avowed in the plan, and expense in the execution.”

Mr. Loudon is more practical on this subject, and observes,—

“The breadth of terraces, and their height relatively to the level of the floor of the living-rooms, must depend jointly on the height of the floor of the living-rooms and the surface of the grounds or country to be seen over them. Too broad or too high a terrace will both have the effect of foreshortening a lawn with a declining surface, or concealing a near valley. The safest mode, in doubtful cases, is not to form this appendage till after the principal floor is laid, and then to determine the details of the terrace by trial and correction.

“Narrow terraces are entirely occupied as promenades, and may be either gravelled or paved; and different levels, when they exist, connected by inclined planes or flights of steps. Where the breadth is more than is requisite for walks, the borders may be kept in turf, with groups or marginal strips of flowers and low shrubs. In some cases the terrace-walls may be so extended as to enclose ground sufficient for a level plot to be used as a bowling green. These are generally connected with one of the living-rooms, or the conservatory; and to the latter is frequently joined an aviary, and the entire range of botanic stoves.”—*Enc. Gard.*

TESTUDINARIA. Two species. Green-house deciduous climbers. Imported roots. Turfy loam and peat.

TETRACERA. Four species. Stove evergreen climbers. Ripe cuttings. Turfy loam and peat.

TETRAGONOLOBUS. Hardy trailing annuals or deciduous trailers. Seeds. Common soil.

TETRAGONOTHECA helianthoides. Hardy herbaceous perennial. Division or seeds. Rich light soil.

TETRAMENA mexicanianum. Green-house shrub. Cuttings and seed. Light rich loam.

TETRANTHERA. Eight species. Stove and green-house evergreen trees and shrubs. Ripe cuttings. Turfy loam, peat, and sand.

TETRANTHUS littoralis. Stove evergreen creeper. Division. Sandy loam.

TETRAPELTIS fragrans. Stove orchid. Division. Peat and potsherds.

TETRAPTERIS. Two species. Stove evergreen shrubs. Cuttings. Peat and loam.

TETRATHECA. Seven species. Green-house evergreen shrubs. Young cuttings. Loam, peat, and sand.

TETTIGONIA spumaria. Froth Fly, or Cuckoo Spit. The frothy patches seen in April and May upon the young shoots of hawthorn, lilac, peach, &c., are formed by this insect. As the froth is formed from the sap of the plant, the insect is by so much injurious to it. The froth protects the insect from the sun, from night colds, and from parasitic insects; but it betrays the insect to the gardener, whose hand is the best remedy.

TEUCRIUM. Forty-seven species. Hardy, half-hardy, and green-house evergreen shrubs and herbaceous perennials; some hardy annuals, and *T. cubense* a stove biennial. The herbaceous perennials increase by division and seeds; the shrubby kinds by young cuttings; the annuals and biennials by seeds. Common soil suits them all.

THALIA dealbata, a half-hardy aquatic perennial, and *T. geniculata*, a stove herbaceous perennial. Division. Light rich soil.

THALICTRUM. Fifty-six species. Hardy herbaceous perennials: a few are twiners. Division. Light soil.

THAPSIA. Seven species. Hardy herbaceous perennials. Seeds. Common soil.

THAPSIUM. Two species. Hardy herbaceous perennials. Division or seeds. Common soil.

THEA. Tea. Three species. Green-house evergreen shrubs. Cuttings. Sandy loam and peat.

THEOPHRASTA Jussieu. Stove evergreen tree. Cuttings, with the leaves left entire.

THERMOMETER. This instrument is the only unfailing guide for the gar-

dener in regulating the heat to which he allows the roots and foliage of his plants to be subjected. Fahrenheit's is that employed in England; but as on the Continent others, differently graduated, are employed, and referred to by

foreign writers, the following table, showing the synonymous degrees of each, will be useful. [See table.]

Fahrenheit's is used chiefly in Britain, Holland, and North America, the freezing point of water on which is at 32°;

Fah.	Reau.	Cent.	Fah.	Reau.	Cent.	Fah.	Reau.	Cent.	Fah.	Reau.	Cent.
212	80.0	100.0	153	53.7	67.2	94	27.5	34.4	35	1.3	1.6 $\frac{1}{2}$
211	79.5	99.4	152	53.3	66.6	93	27.1	33.8	34	0.8	1.1
210	79.1	98.8	151	52.8	66.1	92	26.6	33.3	33	0.4	0.5
209	78.6	98.3	150	52.4	65.5	91	26.2	32.7	32	0.0	0.0
208	78.2	97.7	149	52.0	65.0	90	25.7	32.2	31	— 0.4	— 0.5
207	77.7	97.2	148	51.5	64.4	89	25.3	31.6	30	— 0.8	— 1.1
206	77.3	96.6	147	51.1	63.8	88	24.8	31.1	29	— 1.3	— 1.6
205	76.8	96.1	146	50.6	63.3	87	24.4	30.5	28	— 1.7	— 2.2
204	76.4	95.5	145	50.2	62.7	86	24.0	30.0	27	— 2.2	— 2.7
203	76.0	95.0	144	49.7	62.2	85	23.5	29.4	26	— 2.6	— 3.3
202	75.5	94.4	143	49.3	61.6	84	23.1	28.8	25	— 3.0	— 3.8
201	75.1	93.8	142	48.8	61.1	83	22.6	28.3	24	— 3.5	— 4.4
200	74.6	93.3	141	48.4	60.5	82	22.2	27.7	23	— 4.0	— 5.0
199	74.2	92.7	140	48.0	60.0	81	21.7	27.2	22	— 4.4	— 5.5
198	73.7	92.2	139	47.5	59.4	80	21.3	26.6	21	— 4.8	— 6.1
197	73.3	91.6	138	47.1	58.8	79	20.8	26.1	20	— 5.3	— 6.6
196	72.8	91.1	137	46.6	58.3	78	20.4	25.5	19	— 5.7	— 7.2
195	72.4	90.5	136	46.2	57.7	77	20.0	25.0	18	— 6.2	— 7.7
194	72.0	90.0	135	45.7	57.2	76	19.5	24.4	17	— 6.6	— 8.3
193	71.5	89.4	134	45.3	56.6	75	19.1	23.8	16	— 7.1	— 8.8
192	71.1	88.8	133	44.8	56.1	74	18.6	23.3	15	— 7.5	— 9.5
191	70.6	88.3	132	44.4	55.5	73	18.2	22.7	14	— 8.0	— 10.0
190	70.2	87.7	131	44.0	55.0	72	17.7	22.2	13	— 8.4	— 10.5
189	69.7	87.2	130	43.5	54.4	71	17.3	21.6	12	— 8.8	— 11.1
188	69.3	86.6	129	43.1	53.8	70	16.8	21.1	11	— 9.3	— 11.6
187	68.8	86.1	128	42.6	53.3	69	16.4	20.5	10	— 9.7	— 12.2
186	68.4	85.5	127	42.2	52.7	68	16.0	20.0	9	— 10.2	— 12.7
185	68.0	85.0	126	41.7	52.2	67	15.5	19.4	8	— 10.6	— 13.3
184	67.5	84.4	125	41.3	51.6	66	15.1	18.8	7	— 11.1	— 13.8
183	67.1	83.8	124	40.8	51.1	65	14.6	18.3	6	— 11.5	— 14.4
182	66.6	83.3	123	40.4	50.5	64	14.2	17.7	5	— 12.0	— 15.0
181	66.2	82.7	122	40.0	50.0	63	13.7	17.2	4	— 12.4	— 15.5
180	65.7	82.2	121	39.5	49.4	62	13.3	16.6	3	— 12.8	— 16.1
179	65.3	81.6	120	39.1	48.8	61	12.8	16.1	2	— 13.3	— 16.6
178	64.8	81.1	119	38.6	48.3	60	12.4	15.5	1	— 13.7	— 17.2
177	64.4	80.5	118	38.2	47.7	59	12.0	15.0	0	— 14.2	— 17.7
176	64.0	80.0	117	37.7	47.2	58	11.5	14.4	— 1	— 14.6	— 18.3
175	63.5	79.4	116	37.3	46.6	57	11.1	13.8	— 2	— 15.1	— 18.8
174	63.1	78.8	115	36.8	46.1	56	10.6	13.3	— 3	— 15.5	— 19.4
173	62.6	78.3	114	36.4	45.5	55	10.2	12.7	— 4	— 16.0	— 20.0
172	62.2	77.7	113	36.0	45.0	54	9.7	12.2	— 5	— 16.4	— 20.5
171	61.7	77.2	112	35.5	44.4	53	9.3	11.6	— 6	— 16.8	— 21.1
170	61.3	76.6	111	35.1	43.8	52	8.8	11.1	— 7	— 17.3	— 21.6
169	60.8	76.1	110	34.6	43.3	51	8.4	10.5	— 8	— 17.7	— 22.2
168	60.4	75.5	109	34.2	42.7	50	8.0	10.0	— 9	— 18.2	— 22.7
167	60.0	75.0	108	33.7	42.2	49	7.5	9.4	— 10	— 18.6	— 23.3
166	59.5	74.4	107	33.3	41.6	48	7.1	8.8	— 11	— 19.1	— 23.8
165	59.1	73.9	106	32.8	41.1	47	6.6	8.3	— 12	— 19.5	— 24.4
164	58.6	73.3	105	32.4	40.5	46	6.2	7.7	— 13	— 20.0	— 25.0
163	58.2	72.7	104	32.0	40.0	45	5.7	7.2	— 14	— 20.4	— 25.5
162	57.7	72.2	103	31.5	39.4	44	5.3	6.6	— 15	— 20.8	— 26.1
161	57.3	71.6	102	31.1	38.8	43	4.8	6.1	— 16	— 21.3	— 26.6
160	56.8	71.1	101	30.6	38.3	42	4.4	5.5	— 17	— 21.7	— 27.2
159	56.4	70.5	100	30.2	37.7	41	4.0	5.0	— 18	— 22.2	— 27.7
158	56.0	70.0	99	29.7	37.2	40	3.5	4.4	— 19	— 22.6	— 28.3
157	55.5	69.4	98	29.3	36.6	39	3.1	3.8	— 20	— 23.1	— 28.8
156	55.1	68.8	97	28.8	36.1	38	2.6	3.3			
155	54.6	68.3	96	28.4	35.5	37	2.2	2.7			
154	54.2	67.7	95	29.0	35.0	36	1.7	2.2			

and its boiling point, 212° . *Reaumur's* thermometer was that chiefly used in France before the Revolution, and is that now generally used in Spain, and in some other Continental States. In its scale, the freezing point is 0° ; and the boiling point, 80° . *Celsius* or the *Centigrade* thermometer, now used throughout France, and in the northern kingdoms of Europe, the freezing point is 0° ; and the boiling point, 100° . Hence, to reduce degrees of temperature of the Centigrade thermometer and of that of Reaumur to degrees of Fahrenheit's scale, and conversely:—

Rule 1. Multiply the Centigrade degrees by 9, and divide the product by 5; or multiply the degrees of Reaumur by 9, and divide by 4; then add 32 to the quotient in either case, and the sum is the degrees of temperature of Fahrenheit's scale.

Rule 2. From the number of degrees on Fahrenheit's scale, subtract 32; multiply the remainder by 5, for Centigrade degrees, or by 4 for those of Reaumur's scale, and the product, in either case, being divided by 9, will give the temperature required.

To ascertain the internal temperature of a hot-house, the thermometer should be fixed near its centre, against a pillar, and under a cupola, or little roof, shading it from the sun.

A self-registering thermometer should be in every house, for it shows the highest and lowest degrees of heat which have occurred in the twenty-four hours; and, therefore, serves as a check upon those to whose care they are entrusted.

Bregazzi's bark-bed thermometer is an excellent instrument for ascertaining the bottom heat of hot-beds, bark-pits, &c. It is a thermometer inclosed in a metal tube, perforated to admit the heat, pointed so as to be easily thrust down and with a small door in the side, for observing the degree of temperature shown by the scale. Fig. 166.

THERMOPSIS. Three species. Hardy or half-hardy herbaceous perennials. Seeds. Light rich soil.

THESIUM. Six species. Hardy herbaceous perennials, except *T. am-*

plexicaule, a green-house evergreen shrub; increased by cuttings, and growing best in loam and peat; the herbaceous kinds increase by division or seeds, and require a chalky soil.

THESPESIA. Two species. Stove evergreen trees. Half-ripe cuttings. Sandy loam.

THIBAUDIA. Four species. Stove evergreen shrubs. Cuttings. Turfy loam, peat, and sand.

THINNING. The exhaustion consequent upon the production of seed, is a chief cause of the decay of plants. This explains why fruit trees are weakened or rendered temporarily unproductive, and even killed, by being allowed to ripen too large a crop of fruit, or to "overbear themselves," as it is emphatically termed by the gardener.

The thinning of fruit is consequently one of the most important operations of the garden, though one of the least generally practised. On the weaker branches of the nectarine and peach, an average space of nine inches should be between each brace of fruit, and on the most vigorous wood of the most healthy trees, they should not be nearer than six inches. This enforcement of the importance of thinning fruit, is not intended to be confined to the two trees specified; it is equally important to be attended to in all other fruit-bearers, but especially the vine, apricot, apple, and pear. It should be done with a bold fearless hand, and the perfection of that which is allowed to remain, will amply reward the grower in the harvest time for the apparent sacrifice now made. But he will not reap his reward only in this year, for the trees, thus kept unweakened by over production, will be able to ripen their wood, and deposit that store of inspissated sap in their vessels, so absolutely necessary for their fruitfulness next season.

The berries of the grape vine are best thinned from the branches with a sharp-pointed pair of scissors, care being taken to remove the smallest berries. This increases the weight and excellence of the bunches; for two berries will always outweigh four grown on the same branchlet of a bunch, besides being far handsomer, and having more juice, as compared with the skins. The average weight of the bunches on

Fig. 166.



a vine may be taken, when ripe, at half a pound each, and with this data it is easy to carry into practice Mr. Clement Hoare's excellent rule for proportioning the crop to the size of the vine.

If its stem, measured just above the ground, be three inches in circumference, it may bear five pounds weight of grapes.

3½ inches	10 lbs.
4 "	15 "
4½ "	20 "
5 "	25 "

And so five pounds additional for every half inch of increased circumference.

Thinning is a most necessary operation with plants, as well as with the fruit they bear. The roots of a plant extend in a circle round it, of which the stem is the centre. If the roots of adjoining plants extend within each other's circle, they mutually rob of nutriment, and check each other's growth. Thinning in the seed-bed is the remedy generally applied with too timid a hand.

THOMASIA. Seven species. Green-house evergreen shrubs. Ripe cuttings. Loam, peat, and sand.

THOUINIA pinnata. Stove evergreen shrubs. Ripe cuttings. Sandy loam and peat.

THRIFT. *Statice armeria.* See *Edgings.*

THRIPS, a genus of predatory insects.

T. adonidum is particularly injurious to stove plants. Its different forms are thus portrayed by that excellent entomologist, Mr. Curtis:—

"The larvæ and pupæ are yellowish-white, and the perfect insect is of a dull deep black, with the point, and sometimes the whole of the abdomen, of a rust colour, the wings are dirty white, the horns and legs yellowish, the extremity of the former black; it is very troublesome in hot-houses, attacking tropical plants by piercing the under side of the leaves, and one often sees at the tip of the tail a globule of blackish fluid, which it soon deposits, and by innumerable spots of this glutinous matter the pores of the leaves are stopped up, and large portions of the surface become blotched. During March the full-grown larvæ and pupæ, which are as large as the perfect insect, are found in groups, feeding on the under side of

the leaves, and at this time the recently hatched but perfect insect, either lies close under the ribs, or roves about in search of a mate."—*Gard. Chron.*

T. ochraceus infests the ripe fruit of plums, peaches, and nectarines, piercing the stalks and causing their fall, and rendering the fruit disgusting. It was first noticed, and thus described by Mr. Curtis:—

"It is narrow and linear, of a bright and deep ochreous colour, the eyes are black, the horns appear to be only six-jointed and brownish at the tips; it has three ocelli in the crown, the body is hairy, the tip pointed and bristly, the wings are shorter than the body in the male, lying parallel on the back when at rest, narrow, especially the under ones, and fringed, the hairs longest beneath and at the point, tips of feet dusky."—*Gard. Chron.*

THROATWORT. *Campanula cervicaria.*

THROATWORT. *Campanula trachelium.*

THROATWORT. *Trachelium.*

THRYALLIS brachystachys. Stove evergreen climber. Ripe cuttings. Loam and peat.

THUJA arbor vitæ. Eight species. Evergreen trees, all hardy except *T. articulata*, which is half-hardy, and *T. cupressoides*, which belongs to the greenhouse. Seeds, and *T. pendula*, one of the rarer kinds, by cuttings. A moist soil suits them best. *T. occidentalis* and *T. orientalis* form admirable evergreen hedges, and when properly sheared, inclining inward from the base so that no part is overshadowed, retain their beauty for many years. As a standard, the *occidentalis* or American arbor vitæ, has few superiors among the minor evergreens.

THUNBERGIA. Ten species. Stove evergreen climbers, except *T. auran-tiaca*, a green-house herbaceous perennial. Cuttings or seeds. Sandy loam and leaf mould.

Mr. MacIntyre says, that the species of this genus, "though usually grown in a stove, will flower freely in a greenhouse, or even when they are planted out in the open border, during the summer months; if the situation is sheltered, and exposed to the influence of the sun, they will flower well. In propagating those that are intended for planting out, take off the lateral shoots when they are

of a sufficient length, which, if possible, should be done in March, so that the plants may have attained a medium size before they are put out; pot them in equal quantities of peat and sand, then plunge them in a hot-bed, and they will strike root in a week or two. When they are rooted, pot them off into small pots filled with good rich loam and leaf-mould, mixed with a little sand; then replace them in the pit or frame until the middle of May, when, if the weather is favourable, they may then be planted out. If the soil is not naturally good, it should be made so; and as the plants advance in growth, they should be trained to some kind of support, which may be of any shape that fancy may suggest. If the season is dry, they should be watered and syringed. About the middle of October, take up the plants with good balls, re-pot them, and place them in the green-house. After they have been there for a short time, they may be removed to the stove, where they will keep gay for the greater part of the winter.

"*T. alata* has a beautiful effect when it is planted out on a rock-work, where the plant appears in its natural character, clinging to the various projections, which it quickly covers."—*Gard. Chron.*

THYMRA *spicata*. Half-hardy evergreen shrub. Young cuttings or seeds. Gravelly soil.

THYME. *Thymus vulgaris*.

Varieties.—Broad-leaved Green, Narrow-leaved Green, Variegated, and Lemon-scented. The Variegated is grown almost solely on account of its ornamental foliage.

Soil and Situation.—A poor, light, and dry soil, is best. In moist or rich soils, it becomes luxuriant, but deficient in its aromatic qualities, and generally perishes during the winter. The situation cannot be too open.

Propagation.—By Seeds and rooted Slips.—Sowing may be performed from the middle of March until about the beginning of May, in drills half an inch deep, six inches apart, or as an edging to a bed or border. The seedlings must be kept clear of weeds, and if the season is dry, watered moderately twice a week. When of about six weeks' growth, or when three or four inches high, thin to six inches apart, unless grown as an edging, when they must be left thick. Those removed may be pricked

out at a similar distance, if required; water occasionally until they have taken root. The plants may be left in the situations they are placed in at this season, or be finally planted out in September or October, or in the early spring of the following year. To obtain slips, some old stools may be divided into as many rooted portions as possible, or layers may be obtained by loosening the soil around them, and pegging the lateral shoots beneath the surface. They must be planted out at distances similar to those raised from seed, water and weeding being similarly required.

In autumn the decayed stalks should be cleared away, and a little fresh earth scattered and turned in among the stools.

Although it is perennial, yet after three or four years, thyme becomes stunted and unproductive, consequently requiring to be raised periodically from seed.

By Slips.—These may be planted from the beginning of February until the close of May.

To obtain Seed.—Some plants should be allowed to run up without being gathered from, in early summer. The seed is ripe during July, and must be cut immediately it is so, and laid on a cloth to dry, otherwise the first rain will wash it out of the seed-vessels.

THYMUS. Thyme. Nineteen species, and several varieties. Hardy or half-hardy evergreen shrubs or trailers. *T. corsicus*, an herbaceous perennial. Division, slips, cuttings, or seeds. Dry, light, sandy soil.

THYSANOTUS. Seven species. Green-house or half-hardy herbaceous or tuberous-rooted perennials. Offsets. Sandy loam.

TIARELLA. Four species. Hardy herbaceous perennials. Division. Sandy peat.

TIARIDIUM. Two species. Half-hardy annuals. Seeds. Common soil.

TIGER FLOWER. *Tigridia*.

TIGRIDIA. Two species. Hardy bulbous perennials. Offsets or seeds. Light rich soil.

TILE ROOT. *Geissorhiza*.

TILIA. Lime Tree. Three species, and many varieties. Hardy deciduous trees. Seeds and sometimes layers. Any deep, light, and fertile soil suits them.

TILIACORA *racemosa*. Stove ever-

green climber. Cuttings. Sandy loam and peat.

TILLANDSIA. Thirty-one species. Stove epiphytes. Suckers or seeds. Wood, with a little moss on their roots.

TINEA, a genus of moths, the larvæ of which are very destructive.

T. daucella. Carrot Moth. Head and back and upper wings reddish-brown; abdomen gray and white. Its caterpillar is greenish-gray with black tubercles, and lives on the flowers and seeds of the carrot, but prefers the parsnep.

T. padella. Small Ermine Moth is white with black dots on the upper wings. Eggs deposited in June and July, near the blossom buds of the hawthorn, eunymus, apple and pear tree; caterpillars appear in autumn, and inclose the twigs with a web. In the following spring they attack the petals and calyx. Color, dull lead with a black head.—*Koilar.*

T. Clerckella. Pear Tree Blister Moth. The caterpillars of this raise dark brown blisters on the leaves of the pear tree, and less often on those of the apple. The moth is active and minute, shining like pearly satin, the wings having an orange ground spotted with black and other colors. It appears in May. Mr. Curtis says,—“To check this disease, it will be advisable to wash the tree with soapsuds the end of May or beginning of June, when the moths are pairing and laying eggs for a future progeny; and if a very valuable tree be only partially attacked, the blistered leaves might be gathered and burnt as soon as any spots began to appear in August.”—*Gard. Chron.*

T. capitella. Triple-spotted Currant Tinea. The larvæ of this feed upon the pith of the young shoots of the currant, which they attack in the spring. The moth itself is fuscous; the head with an ochreous tuft; superior wings bronzed, spotted with purple and yellow.

T. porectella. Rocket or Gray-streak Moth, has its habits and forms thus described by Mr. Curtis:—

“During the middle and latter end of April, as the shoots of the rockets advance, it is found that the leaves adhere firmly together, and those that liberate themselves are perforated with large holes. On forcibly opening a shoot, for the young leaves are connected by silken threads, a small green

caterpillar of different shades, varying with its age, is found in or near the centre feeding upon the tender leaves, and sometimes a little family of four or five inhabit the same head. The head feelers and horns of our little moth are white, the latter with a few black spots near the tips; the thorax is cream-coloured, the sides brown, upper wings lance-shaped, very pale clay brown, with whitish streaks. Perhaps the best method of extirpating them would be to search for the young caterpillars between the leaves on the first symptoms of their presence, and extracting them with a small pair of forceps, such as are used for microscopic objects; but as some might be too minute at that early period to be detected on the first search, this operation must be repeated. Pinching the maggots in the bud is also recommended as well as dusting the plants with flower of sulphur, which I fear would be of little use. I think, however, that a portable frame might be constructed and covered with tarred or painted canvas, which could be placed over a bush or small bed of flowers, when it is attacked by insects; and it would then be easy to fumigate any plant by means of an aperture with a tube of leather or any pliable material which could be tied or plugged up, so as to keep in the smoke of tobacco, or even of sulphur, which last would in ten minutes destroy every living animal within the inclosed space.”—*Gard. Chron.*

TIPULA. Crane Fly or Daddy-long-legs.

T. oleracea, the grubs or “leather jackets,” so injurious to the market gardener, are its larvæ. They attack the roots of scarlet beans, lettuces, dahlias, potatoes, &c., from May to August. During the last month and September they become pupæ. Mr. Curtis observes, that—“It is said that lime water will not kill them, and suggests that if quicklime was scattered on the ground at night, it would destroy them when they come to the surface to feed; and all the gnats that are found on the walls, palings, ground or elsewhere, should be killed, especially the female, which would prevent any eggs being deposited in the ground. A mixture of lime and gas water distributed by a watering pot over grass, has completely exterminated the larvæ, where

they had been exceedingly destructive, and by sweeping the grass with a bag-net, like an angler's landing net, only covered with canvas, immense numbers of the gnats might be taken and destroyed."—*Gard. Chron.*

TITHONIA *tagetiflora*. Stove evergreen tree. Cuttings. Light rich soil.

TOBACCO. *Nicotiana*, whether in the form of snuff, or its decoction in water, or its smoke whilst burning, is very destructive to insects.

Tobacco paper is paper saturated with the decoction of tobacco, and when burnt emits a fume nearly as strong. It is an easy mode of generating the smoke. Whenever plants are smoked they should be done so on two following nights, and then be syringed the following morning. Mr. Cameron says,—"I have always found tobacco paper the most efficacious substance to fumigate with for destroying the aphids without doing any injury to the plants; if the house is not filled too rapidly with smoke, and is allowed to reach the glass, without coming in contact with any of the plants, it then descends as it cools, without doing any injury. Plants fumigated in frames, or under hand-glasses, are most liable to be injured by the heat of the smoke, if not done cautiously. There is a spurious kind of tobacco paper sometimes offered in spring by the tobaccoists, apparently made to meet the increased demand, and this kind of paper will bring the leaves off plants, without killing many of the aphides. It is of a lighter color than the genuine sort, and may be readily detected by the smell being very different. Foliage should be perfectly dry when a house is fumigated, and should not be syringed till next morning. If plants are syringed immediately after fumigation, many of the aphides will recover even where they have dropped off the plants, a fact which any one may soon prove after fumigating a house."—*Gard. Chron.*

Another very simple mode of fumigating plants in frames, and under hand-glasses turned over them for the purpose, is as follows:—"Dissolve a tablespoonful of saltpetre in a pint of water; take pieces of the coarsest brown paper, six inches wide, and ten inches long, steep them thoroughly in

the solution, dry them and keep till wanted. To fumigate, roll one of the pieces into a pipe like a cigar, leaving the hollow half an inch in diameter, which fill with tobacco, twist one end and stick it into the soil, light the other, and it will burn gradually away for an hour or more."

Tobacco smoke should not be admitted to fruit trees when in bloom, nor when the fruit is ripening, as it imparts to them a flavour. See *Fumigating*.

Tobacco Water is usually made from what is known as *Tobacconists' Liquor*, being a liquor expressed by them, and full of ammonia and the acrid oil of the plant. To every gallon of this add five gallons of water. This mixture with Read's garden syringe may be sprinkled over the trees, putting it on with the finest rose, and being careful to wet all the leaves. This operation is to be performed only in the hottest sunshine, as the effect is then much greater than when the weather is dull; five gallons of liquor reduced as above stated, cleanses seventeen peach and nectarine trees, averaging seventeen feet in length, and twelve in height. The black glutinous *aphis*, provincially called blight, so destructive to the cherry trees, and in fact every species of *aphis*, is destroyed in the same way with equal facility; the grubs which attack the apricot, may be destroyed almost instantly by immersing the leaves infested in this liquor.—*Gard. Mag.*

As the tobaccoists' liquor cannot be obtained always, tobacco water may be, in such case, made by pouring half a gallon of boiling water upon one ounce of strong tobacco, and allowing it to remain until cold, and then strained.

TOCOCA. Two species. Stove evergreen trees. Cuttings. Peat and loam.

TOCOYENA *longiflora*. Stove evergreen shrub. Cuttings. Sandy peat and loam.

TODDALIA. Two species. Stove evergreen shrubs. Cuttings. Loam, peat, and sand.

TODEA. Two species. Ferns. Green-house herbaceous perennials. Division or seeds. Loam and peat.

TOLPIS. Five species. Hardy annuals. Seeds. Common soil.

"**TOMATO** or Love-apple. This plant is a native of South America, and perhaps of the West Indies; thence in-

roduced into this country. But a few years since it was scarcely known as an esculent—now it is in very general use.

“There are six or seven varieties, between which there is not much real difference; the common red is equal to any.

“Cultivation same as directed for the Melongena, or Egg Plant. It is, however, more free in growth, and will produce fruit tolerably early, when sown on the open border.

“On the approach of frost pull up some of the plants, (root and all,) which are well laden with fruit, and hang them up in a dry, airy apartment. In this manner it may be continued in perfection for some time longer than the natural season.”—*Rural Reg.*

TONQUIN BEAN. *Dipterix.*

TOOL-HOUSE. Upon this too much neglected garden edifice, the editor has been favoured by Mr. Barnes, of Bicton Gardens, with the following excellent remarks:—“Have a place for everything, and everything in its place;—kept in good condition, and at all times put away clean;—for omission of which have rules and fines placed in each of the tool-houses, regularly enforced, and payment demanded for each fine on the labourers’ pay-day. At Bicton, a book is kept for entering each fine, and a separate account given of each fine, and for what, or why, it was enforced; annually, Lady Rolle doubles the amount so collected, and if good order has been kept, and only a small sum so collected, her ladyship trebles the amount. I add my own mite, and each foreman theirs, as a sort of compound for any matter that may have slipped our memories, &c.; the amount is then placed in the *Savings Bank*, as a reserve sum in case of illness, &c. We have the same order and regulation kept in each tool-shed, that is to say, the tool-shed of each department—that I need here describe only one. The tool-shed of the hot-house and flower-garden department is a lean-to shed at the back of a hot-house, substantially built, and covered with slate:—length, fifty-four feet; width, thirteen feet; height at back, fifteen feet; and height in front, nine feet; paved all through with Yorkshire flag-stones, which are neatly swept up every night, the last thing, and washed every Saturday, thoroughly. There is a door at each end, and one in the centre of

the front wall, and a window on each side of the centre door. Strong beams are thrown across from front to back, and strong planks laid on them, which form a useful loft for placing mats, stakes, laths for tally making, brooms, nets, canvas for covering and shading, &c. &c. Within two feet of the roof, against the back wall, is placed a row of pegs the whole length of the shed, for hanging the long-handled tools, such as grass and leaf rakes, long-handled Dutch hoes and iron rakes, &c.; on the next row of pegs, the whole length of the shed, are placed the various kinds of draw hoes, tan forks, dung forks and prongs, strong forks for digging and surface stirring, spades and shovels of various kinds, pickaxes, mattocks and bills, dung drags, edging shears, &c.; on a third row of pegs, still lower, are placed the water pots, all numbered, with initials as well, thus—B, G—45, or 60, whatever the number may run to; underneath those is a row more of pegs, for placing the noses of the water pots—thus the back wall is furnished. The front wall, half way, is furnished with shelves for placing shreds and nails, rope yarn, tallies, flower pegs, whetstones, rubber or scythe-stones, mallets and stake-drivers, trowels, hand-forks, reels and lines, hedge-clipping shears, scythes, chisels, the various sizes of one-handed crane-necked hoes, crowbars, mops, hair-brushes and brooms, and various other articles. The scythes are hung up over the end beam, and on the other side without shelves the hand-barrows are placed; birch and heath brooms, both round and fan-shaped, that are in daily use; and various other articles. The garden rules are hung in a conspicuous place; also in the tool-house. Every tool is to be put into its proper or allotted place, every night, thoroughly cleansed; any omission of which subjects the defaulter to a fine. Each tool-house is under the same system. We have separate wheelbarrow sheds; sheds for placing soils in the dry, arranged in old casks; varieties of sand, pebbles, and flints, for potting purposes, with lofts over for flower pot stowage;—a shed for the liquid manure casks, which is one of the most essential and valuable of all. A shed for

placing the charred articles of all kinds, equal to the last; a potting shed; mushroom shed; stove shed; fruit rooms, and onion lofts, &c. &c.—Each and all are kept under the above regulations.”

TORENIA scabra and *cordifolia*. Green-house evergreen shrubs. Seeds. Sandy loam. There are two other species not worth cultivating.

TORTRIX. A genus of moths.

T. luscana generates a red grub, and *T. cynosbana* a black-spotted green grub, both very destructive of blossom buds.

T. vilisana. Vine Tortrix. Found on the vine in April and May; head yellow; upper wings marbled with rusty and gray colours. Caterpillars appear as the blossom buds open, which they unite with white threads.

T. nigricana. Red Plum Grub Tortrix. Moth black, appearing in June. Eggs deposited on the plum; grub, small red, pierces the fruit, and is found near the stone. Mr. Curtis observes, that—“If the plums that have fallen off be examined, a small red caterpillar will be found within it; the caterpillar being generally full grown when the plum falls off, soon creeps out, and penetrates the loose bark, forming a case in which it remains during the winter. Early in the spring it changes into a light brown pupa, and the moth emerges about June. The moth is not so large as a house-fly; its wings are almost black, and when the sun is shining on them, they have a remarkably metallic lustre; on the outer edge of the fore wings there is an appearance of fine silver dust. Among the remedies proposed to lessen the ravages of this insect, it is recommended to shake the trees, and remove all the fruit that falls off; and another good method is to scrape the rough pieces of bark of the stem, under which the cocoons are concealed; this must be done late in the autumn, or early in the spring.”—*Gard. Chron.*

T. Bergmanniana. Rose Tortrix. Differs little to a common observer from the preceding. “Where bushes are much infested with the larvæ of these insects, it is much better to cut them down and burn the shoots; this and hand-picking are the only remedies we are acquainted with. Care must be taken not to disturb the maggots when collecting them, for they will let them-

selves down by threads, and thus escape.”—*Gard. Chron.*

T. ocellana. This is the parent of the red bud caterpillar, which destroys the buds of the apple and pear. Upper wings gray, with a white transverse band.

T. Wæberiana. Plum tree Tortrix. Its larva feeds on the inner bark of the plum, apricot, almond, and peach. The grubs pierce holes through the bark, which may be detected by small heaps of red powder upon it. Moth brown; grub greenish, with a red head.

T. pomonana. Codling Moth. Its reddish-white grub is common in apples and pears. Moth light gray, streaked with dark gray. Seen of an evening during May, and the grubs appear soon after. All fallen apples should be destroyed, because they usually contain this or other grubs, which will otherwise produce moths, and multiply the evil.

“*T. turionana*, *T. hyrcyniana*, *T. resinella*, and *T. buoliana*, all infest pine trees, injuring them by depositing their eggs in the buds, which are subsequently preyed upon by their caterpillars.”—*Kollar*.—*Gard. Chron.*

TOUCH-ME-NOT. *Impatiens*.

TOURRETIA lappacea. Hardy climbing annual. Seeds. Light soil.

TOWER MUSTARD. *Arabis Turrita*.

TRACHELIUM caruleum. Hardy herbaceous perennial. Seeds or cuttings. Light soil.

TRACHYMENE. Six species. Green-house annuals; increased by seed, and green-house and stove evergreen shrubs, increased by young cuttings. Loam and sandy peat suits them all.

TRACHYTELLA actæa. Green-house evergreen climber. Ripe cuttings. Peat and loam.

TRADESCANTIA. Twenty-seven species. Chiefly stove and hardy herbaceous perennials. A few hardy annuals, and stove and green-house evergreen trailers. *T. paniculata* is a green-house biennial. *T. tuberosa* is a stove tuberous-rooted perennial. Division. The annuals, seeds. Rich light soil suits them all.

TRAGOPOGON. Goat's beard. Fifteen species. Hardy biennials. Seeds. Common soil. *T. porrifolius* is the garden *Salsafy*.

TRAGOPYRUM. Three species.

Hardy deciduous shrubs. Layers. Peat and sandy loam.

TRAILERS. See *Creepers*.

TRAIN OIL. See *Animal Matters*.

TRAINING has for its object rendering plants more productive either of flowers or of fruit, by regulating the number and position of their branches. If their number be too great, they overshadow those below them, and by excluding the heat and light, prevent that elaboration of the sap required for the production of fructification. If they are too few, the sap is expended in the production of more, and in extending the surface of the leaves required for the digestion of the juices.

The position of the branches is important, because, if trained against a wall, they obtain a higher temperature, and protection from winds; and if trained with their points below the horizontal, the return of the sap is checked. Shy-flowering shrubs, as *Diplacis puniceus*, are made to blossom abundantly, and freely-flowering shrubs, as *Cytisus hybridus*, are made to blossom earlier, by having their branches bent *below* the horizontal line. Dr. Lindley, observing upon these facts, proceeds to remark, that—"If a stem is trained erect, it will be more vigorous than if placed in any other position, and its tendency to bear leaves rather than flowers will be increased: in proportion as it deviates from the perpendicular is its vigour diminished. For instance, if a stem is headed back, and only two opposite buds are allowed to grow, they will continue to push equally, so long as their relation to the perpendicular is the same; but if one is bent towards a horizontal direction, and the other allowed to remain, the growth of the former will be immediately checked; if the depression is increased, the weakness of the branch increases proportionally; and this may be carried on till the branch perishes. In training, this fact is of the utmost value in enabling the gardener to regulate the symmetry of a tree. It, however, by no means follows, that because out of two contiguous branches, one growing erect, and the other forced into a downward direction, the latter may die, that all branches trained downwards will die. On the contrary, an inversion of their natural position is of so little consequence to their healthiness, that no effect seems

in general to be produced, beyond that of causing a slow circulation, and the formation of flowers."—*Theory of Hort.*

The reason of this appears in the fact, that a plant propels its sap with greatest force perpendicularly, so much so that the sap rising in a vine branch growing in a right line from the root, with a force capable of sustaining a column of mercury twenty-eight inches high, will, if the branch be bent down to a right angle, support barely twenty-three inches, and if bent a few degrees below the horizontal, the column sustained will not be more than twenty-one inches. This is the reason why at such angles gardeners find the trained branches of their wall trees rendered more productive of blossoms, and furnished with a smaller surface of leaves.

Fig. 167.



A similar effect is produced by training a branch in a wavy form, for two-thirds of its length are placed horizontally, as in the accompanying outline.

—*Princ. of Gardening*.

On the practical parts of training, Abercrombie has the following good directions:—

"When it is intended to raise trained fruit-trees for walls and espaliers, some of the best young plants of the respective sorts, both dwarf and half-standards of one year old, with the first shoots from the budding and grafting entire, should be transplanted in autumn, at eight or ten feet distance, against any kind of fence having a south aspect, in a free situation, not less than four or

five feet high, either a wall, paling, reed-fence, &c.

"The trees thus planted, in spring following, just as they begin to make an effort for shooting, should be headed down; that is, the first shoots from the budding, &c., to be cut down to within three or four eyes or buds of its place of insertion in the stock, especially those intended for dwarfs; also the half-standards, if worked on tall stocks; and this heading down both prevents their running up too high with a single naked stem, branchless below, and causes them to throw out lateral shoots from the lower part, to fill the wall or espalier regularly with branches quite from the bottom upward; for they will soon after push forth strong shoots from all the remaining lower buds, which shoots, when of due length, in summer, should be trained along to the fence, equally to the right and left, at full length, till next spring, when these shoots may also be cut down to six or eight inches' length, to force out a further supply of more branches near the bottom. Continue shortening, more or less, the two or three first sprigs on the last summer's shoots, as you shall see necessary, in order to obtain a proper spread of lower branches to give the tree its intended form. Though this work of pruning short, to obtain laterals, may also be performed occasionally in summer, in May, or early in June, on the strong young shoots of the year, cutting or pinching them down to a few eyes, and they will thereby throw out lower laterals the same season, and, by that means, a year's growth is gained. Branches thus gained arrive to proper length in summer for training in; they should all be trained along close to the wall; and if any fore-right or back shoots come out, rub them all off close, leaving the well-placed side shoots in every part; and let the whole, or as many as possible, be trained in during this season, to have plenty to choose from in the general pruning season of winter or spring—train equally to the right and left on each side of the tree, in a spreading somewhat horizontal manner, nowhere crossing one another, but at parallel distances, and mostly all at full length during the summer's growth.

"In the winter pruning we are to observe that, if more wood was trained

up in summer than now appears necessary, or than can be trained in with due regularity, retrench such superfluities; likewise any remaining fore-right or back shoots, and other irregular growths omitted in summer, not eligibly situated for training in, should also be now all pruned out, cutting everything of the above nature, both superabundances and irregularities, quite close to their origin, being careful, however, to leave all the regular, well-placed, useful shoots that can readily be trained with due regularity, without crowding or crossing one another, all of which should also be cleared from all lateral or side shoots, if any; and with respect to their being shortened more or less, or left entire, you will order, according to your discretion, agreeably to the above-mentioned hints.

"Thus, having obtained a regular spread of branches sufficient to effect the proper expansion requisite to form a trained wall or espalier tree, they must then be pruned according to the method peculiar to each respective sort of fruit, as directed in their culture, each under its proper genus. Training espalier trees is effected exactly in the manner as above, only these may be also trained as they stand in the nursery lines, in the open quarters or borders, &c., by ranging some stout stakes in the ground, along one side of each tree. Where a general luxuriance prevails, while under the course of training, or after, it is advisable, in the work of pruning, to use the knife with moderation; for the more wood we cut out of a generally vigorous tree, and the more the shoots are shortened, the more vigorous will it continue to shoot without ever becoming properly fruitful; and if severe cutting is repeatedly continued, the tree often exhausts so greatly by luxuriant shooting, that it suddenly assumes a weak consumptive state. Such trees as are vigorous only in particular shoots, may, in some cases, have such shoots radically retrenched, and in others reserved; that if a very vigorous shoot runs considerably stronger than all the rest, and seems to support its vigour at the expense of the others in its neighbourhood, it should be retrenched to the very origin, as early in summer as discoverable. In other cases, if a luxuriant shoot arise in any vacant space towards the bot-

tom, especially where a supply of more wood is wanted, it may be retained, and pinched or topped down to a few eyes in May or June; it will send out several laterals below, the same season; and instead of one rude luxuriant shoot, there will be four or five of moderate growth to fill the vacancy more effectually, and that will much sooner attain to fruitfulness."—*Abercrombie*.

Besides the above usual modes of training—for which see also *Walls*, *Espaliers*, and *Standards*—there are two other modes which deserve notice.

Quenouille Training "consists in training one upright central shoot in summer, and shortening it down to fifteen inches at the winter pruning, in order that it may, at that height, produce branches forming a tier, to be trained, in the first instance, horizontally. The shoot produced by the uppermost bud is, however, trained as upright as possible during the summer, and is cut back, so as to produce another tier fifteen inches above the first, and so on until the tree has reached the desired height. In this climate, it is necessary to train the shoot downwards, which is easily done by tying those of the first tier to short stakes, those of each successive tier being fastened to the branches below them. When the shoots are thus arched downwards at full length, or nearly so, they soon come into a bearing state; but in this climate, if cut short, as the French do, they only send up a number of shoots annually. The plan answers very well where it can be at all times properly attended to; but if this cannot be guaranteed, the ordinary form of dwarf is preferable. Quenouilles require more time to be devoted to them than espaliers."—*Gard. Chron.*

Balloon Training.—On this mode I merely extract the following from Dr. Lindley's *Theory of Horticulture*:—

"What are called balloon apples and pears, are formed by forcing downwards all the branches of standard trees till the points touch the earth, and they have the merit of producing large crops of fruit in a very small compass; their upper parts are, however, too much exposed to radiation at night, and the crop from that part of the branches is apt to be cut off. One of the prettiest applications of this principle is that of Mr. Charles Lawrence, described in

the *Gardener's Magazine*, viii. 680, by means of which standard rose trees are converted into masses of flowers. The figure given in that work represents the variety called the 'Bizarre de la Chine,' which flowers most abundantly to the ends of its branches, and was truly a splendid object."

TRANSPLANTING is most successfully performed, whenever the roots are least required for supplying the leaves with moisture. The reason is obvious, because the roots are always in some degree broken, and lessened in their absorbing power, by the process of removal. Now the leaves require least moisture in the autumn and winter, therefore, these are the seasons when transplanting is effected with least injury to a plant. That such is the rationale of seasonable transplanting is proved by the fact that pots in plants, with reasonable care, may be transplanted at any season. This rule, too, is sanctioned both by theory and practice—transplant as early as possible after the leaves cease to require a supply of sap, the reason for which is, that the vital powers in the roots continue active long after they have become torpid in the branches and fresh roots are formed during the autumn and winter, to succeed those destroyed by transplanting.

"If the months of November and December," says Dr. Lindley, "are the most favourable for transplanting deciduous trees, and March and April the worst, how much more important must be those periods to evergreens. An evergreen differs from a deciduous plant in this material circumstance, that it has no season of rest; its leaves remain alive and active during the winter, and, consequently, it is in a state of perpetual growth. I do not mean that it is always lengthening itself in the form of new branches, for this happens periodically only in evergreens, and is usually confined to the spring; but that its circulation, perspiration, assimilation, and production of roots are incessant. Such being the case, an evergreen, when transplanted, is liable to the same risks as deciduous plants in full leaf, with one essential difference. The leaves of evergreens are provided with a thick hard epidermis, which is tender and readily permeable to aqueous exhalations only when quite young and

which becomes very firm and tough by the arrival of winter, whence the rigidity always observable in the foliage of evergreen trees and shrubs. Such a coating as this is capable, in a much less degree than one of a thinner texture, such as we find upon deciduous plants, of parting with aqueous vapour; and, moreover, its stomates are few, small, comparatively in active, and chiefly confined to the under side, where they are less exposed to dryness than if they were on the upper side also.

“But although evergreens, from their structure, are not liable to be affected by the same external circumstances as deciduous plants in the same degree; and although, therefore, transplanting an evergreen in leaf is not the same thing as transplanting a deciduous tree in the same condition, yet it must be obvious that the great extent of perspiring surface upon the one, however low its action, constitutes much difficulty, superadded to whatever difficulty there may be in the other case.

“Hence we are irresistibly driven to the conclusion that whatever care is required in the selection of a suitable season damp, and not too cold for a deciduous tree, is still more essential for an evergreen.”—*Theory of Hort.*

It sometimes happens that transplanting has to be performed at the most inauspicious seasons; and when this is the case the following directions, given by Mr. Williamson, of the Sheffield Botanic Garden, may be followed with success:—

“At the Sheffield Botanical Gardens we have for some time practised what we term the *washing in-system*, which has been attended with success in every instance. Indeed, I doubt not that by this method trees of considerable size may be removed, at any season of the year, with safety. Towards the latter end of last May I had occasion to form a block or screen, in a situation fully exposed to the sun, for which purpose I transplanted a number of tall trees and evergreens, not one of which was injured by the removal; and early this May we disposed of upwards of a dozen large horse-chestnuts, Spanish ditto, limes, sycamore, and birches, all from ten to eighteen feet high, in full leaf, to a gentleman in this neighbourhood, the planting of which I superintended. All at this time (a fortnight subsequently)

exhibit no appearance of having been removed. In the first place, we make the hole where the tree is intended to be placed sufficiently large for the roots to be extended at full length; and, in removing the tree, great care is taken to avoid cutting or injuring the roots. If a ball of earth is retained so much the better, as it will assist in steadying the tree; but, if well staked, it is not of much importance. As it is essential that the roots be as little exposed to the atmosphere as possible, we provide sufficient earth, either sifted or finely reduced by a spade or rake, and have in readiness as many buckets of water as will nearly fill the hole; the tree is then placed in its intended position; the whole of the water is then thrown over the roots, the fibres of which will be supported by it. The fine earth is then expeditiously sprinkled over the surface of the water, and, gradually subsiding, fills all the interstices, and gives stability to the tree, which is further secured by three stakes placed at right angles, which finishes the operation. The earth must not be trodden, as is often done.”—*Gard. Chron.*

The following observations, in the *Gordener's Chronicle*, so epitomize all that is practically essential in transplanting, that it is extracted with little abbreviation:—

“In the removal of large trees or shrubs, first form the pit, where the plant is to be planted, from twelve to fourteen inches wider than the roots will reach.

“In lifting laurels, and other evergreens, always bind up the plant with strong straw ropes, tying one end of the rope to one of the strong branches in the centre of the plant, and, taking up all the branches, draw into as small a compass as possible, without injuring the plant. Clear the roots, and, supposing the plant to be a common laurel, six or eight feet high, begin as many feet from the main stem, and cut a trench round the plant at the said distance, as deep as it may be supposed the roots have gone down; then reduce the ball by degrees with a fork, cleaning out the soil with a spade, and taking care not to injure any of the roots or fibres. These tie up in trusses with matting, in order to prevent them, as much as possible, from being injured. Clear the roots to within two or three

feet of the main stem, and then undermine the solid piece that is left.

“When the plant is ready for removal, the strength for lifting it will depend upon its size, and the weight of the ball left, if any. When the plant is brought to the pit and placed in the centre of it, untie the roots, and dress with a sharp knife any that may have been bruised. Shorten strong ones, that they may make young fibres, upon which the welfare of the plant in a great measure depends. After dressing the roots, lay them all carefully out round the pit. If there are one, two, or three layers of roots, as is often the case, keep each layer by itself, and lay out the undermost first, taking care to spread out every fibre with the hand. On these spread well-broken soil; but in doing this, care must be taken not to club the roots together. After the first layer of roots is well covered proceed with the next, and so on until all is finished.

“After transplanting, never give the plants water oftener than once, which is immediately after the operation of planting is performed. Many young trees and shrubs are destroyed (after having been transplanted) by the frequent application of water in dry weather. After the roots are all well covered, leave the pit three or four inches unfilled, and apply the water according to the state of the soil, and size of the plant. To a shrub, that covers about four square yards of ground (if the soil is not very moist), give about eight common sized watering potsful, and so on for every square yard of ground covered. The only treading to be permitted is merely what may take place in going round them in taking away the rope and spreading out the branches in their original position. The above remarks apply well to the common and Portugal laurel, and also to deciduous trees and shrubs in general. A few kinds that are difficult to remove without balls when they are large plants, are the following:—the holly is one that is impatient of being removed without a ball, and in free light soils it will not lift with one. The best method with it is this. Two years before removal, open a trench round the plant about two feet from the main stem (more or less, according to its size). Two feet will do for a plant six feet high. Go as deep as there are roots,

and cut clean off all those outside of the ball, and again fill in the soil. In about two years afterwards, the cut roots will have made firm young fibres, which supply the plant with food when it is transplanted. In lifting them, always try to get a good ball with them. The Laurestinus is not very fond of being removed without a ball. There are but very few of the fir tribe that can be transplanted after they have attained the height of from six to sixteen feet; but the best are the silver, the spruce, and the Weymouth pines. The silver fir bears transplanting tolerably well, provided care is taken not to injure the roots, which run horizontally near the surface. The spruce lifts well, even when sixteen feet high; and the Weymouth pines from ten to twelve feet high. In lifting them always try to get good balls with them, keeping their roots as entire as possible, and making the pits wherein they are to be planted large, so as to get all their roots spread out as regularly as possible; when covered, water in the same manner as evergreen shrubs. In lifting and transplanting hard-wooded trees, such as oaks, &c., keep their roots as entire as possible, and shorten in any strong ones; they should be well watered. It is very essential to the welfare of plants that have been transplanted to have them well supported to prevent them from shaking with the wind, &c. For trees from ten to twenty feet high, use three poles, set up in the form of a triangle; roll a straw rope round the stem of the tree, for the poles to rest on, as it prevents them from hurting the bark; then, after tying the poles firmly to the tree, and fixing them in the ground, the work is finished. For plants of smaller size use small rope, tied in the same manner to the tree, and fixed to stakes driven into the ground, after the manner of tent ropes.

“No doubt the summer months are not proper for transplanting, therefore it should be avoided if possible. From October to April, all shrubs, &c., may be lifted with safety. November is preferable for lifting large plants, as those planted about that time always send out young roots during winter; frequently by February, from one to three inches long.—*Gard. Chron.*

T R A P A. Four species. Aquatic plants. Green-house, stove, and hardy

annuals and biennials. Seeds. Rich loamy soil, in water.

TRAVELER'S JOY. *Clematis vitalba*.

TRAVELER'S JOY. *Clematis virginiana*.

TREACLE MUSTARD. *Clypeola*.

TREE CELANDINE. *Bocconia frutescens*.

TREE GUARDS. The following are cheap and effectual. Mr. W. Brown, gardener at Merevale Hall, uses stakes about the thickness of the wrist, seven feet in length, and tolerably straight: he chops each a little flat on one side, gets some iron hoops a little thicker than coopers are in the habit of using for barrels; he punches holes through it six inches apart (with one near each end), nails it to the stakes on the chopped side, one foot from the top of them, and one foot from the bottom; then raises it and bends it circularly round the tree, observing that the hoops are placed inside nearest the tree; the holes left at each end of the hoop are then clenched up with a nail, and the guard is then complete.—*Gard. Chron.*

The following plan is somewhat similar:—"Procure stakes of ash or larch, six feet in length, or more if requisite, and about two inches in diameter, and bore holes through the tops and bottoms, about one foot from each end. Get a similar hole drilled up the centre of a stake, and saw it off in lengths of two inches, or rather less; pass a strong wire or thick tarred string through one stake, by the holes, at the top and at the bottom, then pass it through the hole made in one of the two inch pieces at each end, and then through another stake, separating each stake at top and bottom by a piece of wood, until you leave enough to surround the tree loosely, leaving plenty of space for growth. Place it round the tree, and fasten the ends of the wire or string. This guard is much the same as a cradle put round the neck of a blistered horse, to prevent his gnawing the irritated part. The stakes merely rest on the ground, and should be cut quite flat at the bottom, to prevent their sticking into the ground. At the upper end they should have a sharp slanting cut with a bill-hook, and threaded with the slope towards the tree. The motion of the tree will not in any degree be impeded; and the bark cannot be injured, let the

wind blow as it may, for the guard moves freely with the tree in every direction."—*Gard. Chron.*

TREES are a chief material in landscape gardening. Trees and shrubs are of different shapes, colours, and growths.

"The varieties in their shapes," says Mr. Whateley, "may be reduced to the following heads. Some thick with branches and foliage have almost an appearance of solidity, as the beach, the elm, the lilac, and uringa. Others thin of boughs and of leaves, seem light and airy, as the ash, and the arbele, the common arbor vitæ, and the tamarisk.

"There is a mean betwixt the two extremes, very distinguishable from both, as in the bladder-nut, and the ash-leaved maple. They may again be divided into those whose branches begin from the ground, and those which shoot up in a stem before their branches begin. Trees which have some, and not much clear stem, as several of the firs, belong to the former class; but a very short stem will rank as a shrub, such as the althæa in the latter.

"Of those whose branches begin from the ground, some rise in a conical figure, as the larch, the cedar of Lebanon, and the holly. Some swell out in the middle of their growth, and diminish at both ends, as the Weymouth pine, the mountain ash, and the lilac; and some are irregular and bushy from the top to the bottom, as the evergreen oak, the Virginian cedar, and Guelder rose. There is a great difference between one whose base is very large, and another whose base is very small, in proportion to its height; the cedar of Lebanon and the cypress, are instances of such a difference, yet in both the branches begin from the ground.

"The heads of those which shoot up into a stem, before their branches begin, sometimes are slender cones, as of many firs, sometimes are broad cones, as of the horse-chestnut, sometimes they are round, as of the stone pine, and most sorts of fruit trees; and sometimes irregular, as of the elm. Of this last kind there are many considerable varieties.

"The branches of some grow horizontally, as of the oak. In others they tend upwards, as in the almond, and in several sorts of broom, and of willows. In others they fall, as in the lime and

the acacia; and in some of these last they incline obliquely, as in many of the first; in some they hang directly down, as in the weeping willow.

"These are the most obvious great distinctions in the shapes of trees and shrubs. The difference between shades of green cannot be so considerable, but these also will be found well deserving of attention.

"Some are of a dark green, as the horse-chestnut and the yew. Some of a light green, as the lime and the laurel. Some of a green tinged with brown, as the Virginian cedar. Some of a green tinged with white, as the arbele and the sage tree. And some of a green tinged with yellow, as the ashen-leaved maple and the Chinese arbor vitæ. The variegated plants also are generally entitled to be classed with the white or the yellow, by the strong tincture of the one or the other of those colours on their leaves.

"The fall of the leaf is the time to learn the species, the order, and the proportion of tints, which blended, will form beautiful masses; and, on the other hand, to distinguish those which are incompatible near together.

"The peculiar beauty of the tints of red, cannot then escape observation, and the want of them throughout the summer months must be regretted; but the want, though it cannot perfectly, may partially be supplied, for plants have a permanent and an accidental colour. The permanent is always some shade of green, but any other may be the accidental colour; and there is none which so many circumstances concur to produce as a red. It is assumed in succession by the bud, the blossom, the berry, the bark, and the leaf. Sometimes it profusely overspreads, at other times it dimly tinges the plant, and a reddish-green is generally the hue of those plants on which it lasts long or frequently returns.

"Admitting this, at least for many months in the year, among the characteristic distinctions, a large piece of red-green, with a narrow edging of dark green, along the further side of it, and beyond that, a piece of light green, still larger than the first, will be found to compose a beautiful mass. Another, not less beautiful, is a yellow green, nearest to the eye, beyond that a light green, then a brown green, and lastly a

dark green. The dark green must be the largest, the light green the next in extent, and the yellow green the least of all.

"From those combinations, the agreements between particular tints may be known. A light green may be next either to a yellow or a brown green, and a brown to a dark green; all in considerable quantities, and a little rim of dark green may border on a red or a light green.

"Further observations will show, that the yellow and the white greens connect easily; but that large quantities of the light, the yellow, or the white greens, do not mix well with a large quantity also of the dark green; and that to form a pleasing mass, either the dark green must be reduced to a mere edging, or a brown or an intermediate green must be interposed; that the red, the brown, and the intermediate greens agree among themselves, and that either of them may be joined to any other tint; but that the red green will bear a larger quantity of the light than of the dark green near it; nor does it seem so proper a mixture with the white green as with the rest. In massing these tints, an attention must be constantly kept up to their forms, that they do not lie in large stripes one beyond another; but that either they be quite intermingled, or, which is generally more pleasing, that considerable pieces of different tints, each a beautiful figure, be in different proportions placed near together.

"Exactness in the shapes must not be attempted, for it cannot be preserved; but if the great outlines be well drawn, little variations afterwards occasioned by the growth of the plants, will not spoil them. Another effect attainable by the aid of the different tints, is founded on the first principles of perspective; objects grow faint as they retire from the eye; a detached clump or a single tree of the lighter green will, therefore, seem farther off than one equidistant of a darker hue, and a regular gradation from one tint to another will alter the apparent length of a continued plantation, according as the dark or the light greens begin the gradation.

"Single trees scattered about a lawn, cast it into an agreeable shape, and to produce that shape, each must be placed with an attention to the rest; they may stand in particular directions, and col-

lectively form agreeable figures, or between several straggling trees, little glades may open full of variety and beauty. The lines they trace are fainter than those which larger plantations describe, but then their forms are their own; they are therefore absolutely free from all appearance of art; any disposition of them, if it be but irregular, is sure to be natural.

“The situations of single trees, is the first consideration, and differences in the distances between them, their greatest variety. In shape, they admit of no choice but that which their species afford: greatness often, beauty often, sometimes mere solidity, and now and then peculiarity alone, recommends them. Their situations will also frequently determine the species; if they are placed before a continued line of wood only to break it, they should commonly be similar to the trees in that wood, they will else lose their connection, and not affect the outline which they are intended to vary; but if they are designed to be independent objects, they are as such more discernible, when distinguished both in their shapes and their greens, from any plantations about them. After all, the choice, especially in large scenes, is much confined to the trees on the spot; young clumps from the first have some, and soon produce a considerable effect; but a young single tree for many years has none at all, and it is often more judicious to preserve one already growing, though not exactly such as might be wished, either in itself or in its situation, than to plant in its stead another, which may be a finer object, and better placed, in a distant futurity.” See *Clump, Avenue, Grove and Wood*.

TREE MALLOW. *Lavatera arborea*.

TREE OF SADNESS. *Nyctanthes arbor tristis*.

TREE or CANADA ONION. *Allium proliferum*. This, like the Ciboule, is without a bulbous root, but throws out numerous offsets. Its top bulbs are greatly prized for pickling, being considered of superior flavour to the common onion for that purpose, as well as others in which that species is employed.

Time and Mode of Planting.—It is propagated both by the root offsets, which may be planted during March and April, or in September and October, and from the top bulbs, which are best

planted in spring. The old roots are best to plant again for a crop of bulbs, as they are most certain to run to stems. If the bulbs be planted earlier than as above directed, they are apt to push up the same season and exhaust themselves, without producing either good offsets or bulbs; but, on the other hand, by planting the old roots in the previous autumn, or early in the spring, they will produce good bulbs the same year. They must be inserted in rows twelve inches asunder, in holes six inches apart and two deep, a single offset or bulb being put in each. Those planted in autumn will shoot up leaves early in the spring, and have their bulbs fit for gathering in June or the beginning of July; those inserted in the spring, will make their appearance later, and will be in production at the close of July or early in August; they must not, however, be gathered for keeping or planting until the stalks decay, at which time, or in the spring also, if only of one year's growth, the roots may be taken up and parted if required for planting; but when of two or three years' continuance, they must at all events be reduced in size, otherwise they grow in two large and spindling bunches; but the best plan is to make a fresh plantation annually with single offsets. The only cultivation necessary is to keep them clear of weeds; and when the stems run up, to give them the support of stakes.

The bulbs, when gathered, must be gradually and carefully dried in a shady place; and if kept perfectly free from moisture, will continue in a good state until the following May.

TRELLIS or TREILLAGE, is an arrangement of supporters upon which to train plants.

Espalier Trellis.—The cheapest, the easiest, and soonest made, is that formed with straight poles or stakes, of ash, oak, or chestnut, in lengths of from five to six or seven feet, driving them in the ground in a range about a foot distant, all of an equal height; and then railed along the top with the same kind of poles or rods, to preserve the whole form in a regular position. They should be full an inch and a half thick, and having pointed them at one end, drive them with a mallet into the ground in a straight range, close along the row of trees, a foot deep at least. To render

treillage still stronger, run two, three, or more ranges of rods, along the back part of the uprights, a foot or eighteen inches asunder, fastening them to the upright stakes, either with pieces of strong wire twisted two or three times round, or by nailing them.

When the treillage is finished, it is advisable to paint the whole to render it both more beautiful and durable; and the durability is greatly increased by charring the ends of the uprights before driving them into the soil.

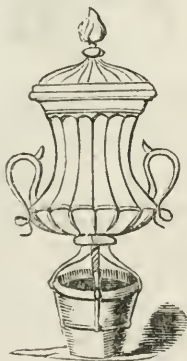
Espalier Trellis made of cast iron rods, is much more durable, and neater, than that made of wood.

Trellis for Climbers.—These have been greatly improved, or rather created within these few years, for ten years ago we had nothing but stakes and rods. The following observations and designs are from the *Gardener's Chronicle*:—

“The beauty of green-houses has been wonderfully increased, by the contrivance of compelling these unmanageable rambling scrambling plants, to grow down upon themselves, or round and round a circular trellis, so as to be compelled to clothe themselves all over with foliage, and to present immediately to the eye whatever flowers they produce. Every one who has ever witnessed the exhibitions in the garden of the Horticultural Society, must have been struck with the extraordinary beauty of the *Russelias*, and *Tropæolums*, *Lichyas*, and *Hardenbergias*, red, yellow, crimson, and blue, which have graced the stands of even the least extensive growers. It is not because some climbing plants require to have their roots confined in garden pots, nor because being, in the majority of cases, inhabitants of tropical forests, they demand more bottom-heat than they can obtain in this country, when planted in the open border of a conservatory that the modern plan of distributing their branches over the trellis of a flower-pot, is to be so much commended. Nor is it because the flowers, which if the branches are uncontrolled, are carried out of sight by the excessive length of the stems, are thus brought immediately before the eye; but there is another great advantage in this practice. Gardeners need not be told that the immediate effect of compelling branches to grow downwards is to make them bloom. This

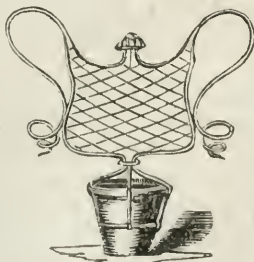
was effected over the walls of Sir Joseph Banks' house; and as those branches were always loaded with fruit, the practice was soon imitated, and gave rise, among other things, to what is called balloon training. This produces an abundance of flowers, in the most sterile trees, and of fruit, when the branches are not exposed to severe night frosts, which kill the blossoms. Just the same consequences follow the training of climbing plants downwards; they are compelled to yield a far greater crop of flowers than if permitted to grow at full length. The many kinds of trellises that have been invented for this purpose, are admirably adapted for compelling plants to grow upside down; for the branches can be bent in all directions, over and over again, and the more they are entangled, the prettier is the effect produced.

Fig. 168.



“The accompanying forms will be

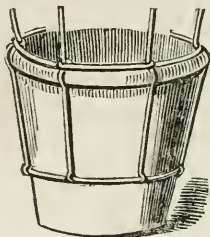
Fig. 169.



admirably adapted for *Gompholobium*, *Tropæolum tricolor*, and other plants possessed of scanty foliage, whose branches require to be closely trained to produce a good effect.

"The following cut will show the manner in which the wire-trellis for climbing plants, is attached to the pots, a matter of great importance, and of which the separate plans that have been proposed, and some of which are published, convey an incorrect idea.

Fig. 170.

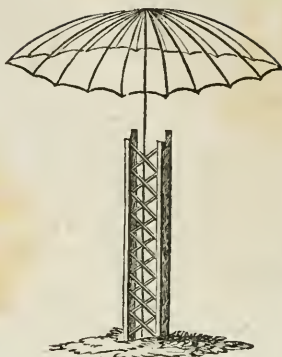


"It will be seen that a strong wire ring is carried round the pot, a little above its bottom. To this a sufficient number of upright wires are attached all round. The upright wires are pressed down upon the surface of the pot, till they reach the rim, over which they are firmly bent till they reach the highest point of the rim, or are even bent a little within it. At this point they are secured by a second ring of stout wire, adjusted as in the drawing, which having been done, the uprights are directed upwards, and fashioned into the pattern required. By these means, a sort of collar is formed upon the rim of the pot, which prevents the trellis from slipping downwards, while at the same time, the lowest ring of wire keeps it from swinging and swaying backwards and forwards."—*Gard. Chron.*

Umbrella Trellis is a form excellently adapted for *Wisteria sinensis*, and other climbers or shrubs having long racemes of flowers. The following (Fig. 171) is its form.

Hothouse Trellis for training vines near the glass, is usually made of thin rods of deal or of iron, placed about a foot apart, and fastened to the framework of the building. Mr. Long, Beau-

Fig. 171.



fort Place, Chelsea, has invented a movable wire trellis, by which the vines may be lowered from the roof, or placed at any angle, without injuring the vines. This is an excellent mode of removing them from the influence of extreme exterior heat or cold. A still further improvement would be to have the vertical rods movable round the rod horizontally fixed to the rafter or roof, for then the whole trellis might be raised to an angle with, or even close to the glass, whenever sun to the vine upon the trellis, or shade to the plants within the house was desirable.

Trellis for Walks.—The following observations made by Mr. Loudon, when criticising the gardens of Lord Selsey, at Westdean, comprise all that need be said upon this kind of structure.

"Among the contrivances adopted for giving interest to the walks, and to separate one scene from another, are portions of walk covered with arched trellis work. One of these is grown over with climbing roses; another with laburnums, which in the flowering season has a remarkably fine aspect, few colours looking so well in the shade as yellow, because, with the exception of white, none suffer so little from the absence of light. This laburnum trellis has a new feature, that of a table border of trellis work intended to be covered with ivy; we have no doubt its effects will be good, especially in winter. We must remark some circumstances in the construction of garden

trellises, which should be ample in their dimensions, strictly geometrical in all their forms, and most accurately and substantially executed. Nothing can be more miserable in its effect on the eye than a low narrow archway, the support leaning in different directions, and the curve of the ground plan and of the roof in no marked style of determinate line. The most accurate carpentry and smithwork ought always to be employed in such structures, otherwise they had much better be omitted as garden decorations. Some attempt forming trellises over walks with long hazel rods, but nothing can be meaner than the effect: such rod trellis works or arbours are at best fit for a cottage garden, or a hedge alchouse.”—*Gard. Mag.*

TREMBLING ASPEN. *Populus tremula.*

TRENCHING is one of the readiest modes in the gardener's power for renovating his soil. The process is thus conducted:—

“From the end of the piece of ground where it is intended to begin, take out a trench two spades deep, and twenty inches wide, and wheel the earth to the opposite end to fill up and finish the last ridge. Measure off the width of another trench, then stretch the line and mark it out with the spade. Proceed in this way until the whole of the ridges are outlined, after which begin at one end and fill up the bottom of the first trench with the surface or ‘top spit’ of the second one; then take the bottom ‘spit’ of the latter, and throw it in such a way over the other as to form an elevated sharp-pointed ridge. By this means a portion of fresh soil is annually brought on the surface to the place of that which the crop of the past season may have in some measure exhausted.”—*Gard. Chron.*

Bastard-Trenching is thus performed:—

“Open a trench two feet and a half or a yard wide, one full spit, and the shoveling deep, and wheel the soil from it to where it is intended to finish the piece, then put in the dung and dig it in with the bottom spit in the trench, then fill up this trench with the top spit, &c., of the second, treating it in like manner, and so on. The advantages of this plan of working the soil are, the good soil is retained at top, an

important consideration where the subsoil is poor or bad, the bottom soil is enriched and loosened for the penetration and nourishment of the roots, and allowing them to descend deeper, they are not so liable to suffer from drought in summer; strong soil is rendered capable of absorbing more moisture, and yet remains drier at the surface by the water passing down more rapidly to the subsoil, and it ensures a thorough shifting of the soil.”—*Gard. Chron.*

In all trenching, whether one, two, or more spades deep, always, previous to digging, put the top of each trench two or three inches deep or more, with all weeds and other litter at the bottom of the open one, which not only makes clean digging, and increases the depth of loose soil, but all weeds and their seeds are regularly buried at such a depth, that the weeds themselves will rot, and their seeds cannot vegetate.

TREVIRANIA. See *Achimenes*.

TREVIRANIA pulchella. Stove herbaceous perennial. Division. Light rich soil.

TREVOA. Two species. Greenhouse evergreen shrubs. Young cuttings. Sandy loam and peat.

TREWIA nudiflora. Stove evergreen shrub. Cuttings. Sandy loam and peat.

TRIBULUS. Eight species. Greenhouse and hardy trailing annuals or stove evergreen trailers; the annuals increase by seeds, and common soil will suit them; the evergreens increase by cuttings or seeds, and grow best in loam and peat.

TRICHOCEPHALUS. Three species. Greenhouse evergreen shrubs. Young cuttings. Sandy peat.

TRICHOCLADUS crinitus. Greenhouse evergreen shrub. Young cuttings. Sandy loam and peat.

TRICHOMANES. Two species. Ferns. Hardy and stove herbaceous perennials. Division or seeds. Loam and peat.

TRICHONEMA. Sixteen species. Greenhouse, hardy and half-hardy bulbous perennials. Offsets. Sandy loam and peat.

TRICHOPE TALUM gracile. Half-hardy herbaceous perennial. Division. Light rich soil.

TRICHOPILIA tortilis. Stove epiphyte. Division. Wood with a little moss on the roots.

TRICHOSANTHES *anguina*. Snake Gourd. Frame trailing annual. Seeds. Common soil.

TRICHOSTEMA. Two species. Hardy annuals. Seeds. Common soil.

TRICORYNE. Three species. Greenhouse herbaceous perennials, except *T. simplex*, a green-house biennial increased by seeds, the other two by division; a light rich soil suits them all.

TRIDENTIA. Seven species. Stove evergreen shrubs. Cuttings. Sandy loam and brick rubbish.

TRIENTALIS. Two species. Hardy herbaceous perennials. Division or seeds. Light rich soil.

TRIFOLIUM. Trefoil or Clover. One hundred and two species. All hardy, chiefly annuals, some herbaceous perennials, and a few deciduous, herbaceous, and annual trailers. Division or seeds. Common soil.

TRIGONIDIUM. Four species. Stove orchids. Division. Fibrous peat.

TRIGUERA *ambrosiaca*. Hardy annual. Seeds. Common soil.

TRILLIUM. Fifteen species. Hardy tuberous-rooted perennials. Division or seeds. Peaty soil.

M. F. Otto observes, that—"Seven species are cultivated in our gardens, namely: *Trillium sessile*; *T. erythrocarpum*; *T. pusillum*; *T. cernuum*; *T. erectum*; *T. pendulum*; and *T. grandiflorum*. Their cultivation is very simple. They grow freely in the open air without covering, in shady places, and in a mixture composed of marsh or heath soil, mixed with river sand. They bloom abundantly every year, in April and May, and are a great ornament to our gardens; the tuberous roots spread rapidly by the formation of lateral eyes, so that after some years, if the plants have not been removed, they will form large handsome bushes. The seeds ripen in August, and if sown immediately, they will come up the following year. They may be sown either in the open ground, in a shady peat border, or in pots. The stronger seedlings will bloom in the third season."—*Gard. Chron.*

TRIOPTERIS. Two species. Stove evergreen twiners. Ripe cuttings. Loam and peat.

TRIPHENIA *pronuba*. Yellow Underwing Moth. Mr. Curtis says that "its caterpillar is hatched in July or August, and if the egg has been depo-

sited in a cabbage or cauliflower, the young larva immediately eats its way to the centre, on which it feeds till it is full grown, when it is about two inches long, greenish or brownish green in colour, with two rows of black spots on the back. During the winter, it lies beneath stones or clods of earth, and in April or May it descends a few inches below the surface, where it changes to a reddish pupa, from which the perfect moth emerges in June or July. The moth varies in size from two to two and a half inches: the upper wings are brownish or grayish, with an indistinct kidney-shaped spot near the centre; the lower wings are bright yellow, with a narrow black band. The moth varies considerably in its colour and markings, scarcely two individuals ever being exactly alike. The caterpillar, though it most frequently is found on the cabbage or cauliflower, yet sometimes does considerable mischief to celery, and even the young leaves and flower-buds of auriculas, primroses, and violets are destroyed by it. The only remedy we can suggest is to search for and destroy them."—*Gard. Chron.*

TRIPHASIA *trifoliata*. Green-house evergreen shrub. Ripe cuttings. Turfy loam and peat.

TRIPTILION. Two species. Hardy annuals. Seeds. Common soil.

TRISTANIA. Eight species. Green-house evergreen trees and shrubs. Half ripe cuttings. Loam, peat, and sand.

TRITELEIA. Three species. Half-hardy bulbous perennials. Offsets or seeds. Peat, loam, and sand.

TRITOMA. Four species. Hardy or half-hardy herbaceous perennials. Suckers. Light rich soil.

TROCHETIA *grandiflora*. Stove evergreen shrub. Cuttings. Rich light loam.

TROCHOCARPA *laurina*. Green-house evergreen shrub. Cuttings. Sandy peat and turfy soil.

TROLLIUS. Globe Flower. Seven species. Hardy herbaceous perennials. Division or seeds. Light moist soil.

TROMOTRICHE. Five species. Stove evergreen shrubs. Cuttings. Sandy loam and brick rubbish.

TROPÆOLUM. Nasturtium. Fourteen species. Green-house hardy and half-hardy annuals, and evergreen twiners. *T. brachyceras* and *T. tuberosum* are half-hardy tuberous-rooted

perennials. The green-house and half-hardy species increase by cuttings, and require a light rich soil. The annuals, seeds only, and common soil. The tuberous-rooted, cuttings, loam, and peat. Some of the species require particular treatment, as follows:—

T. tricolorum.—Mr. Falconer, gardener to A. Palmer, Esq., of Cheam, enters fully into its cultivation. He says that—"the soil best suited to it is a mixture of loam, peat, and sand, with a small portion of soot; this mixture to be exposed to the influence of the sun from May until time to plant the tubers. About the latter end of June, or as soon as the decay of the stem and ripening of the seed show that the circulation of the sap has ceased, turn out the tubers from the pots, and having carefully removed the soil, put the tubers in flower pans upon a shelf in a dry room. About the beginning of September they produce their new stems; let them remain until they have lengthened from twelve to fifteen inches. Having well drained a No. 12 pot, fill it up with the compost to within four inches of the top, then place the tuber in the centre of the pot, and coil the stem or stems around, carefully filling up with the compost until about two inches of the stem are left above the soil. After potting, place the pots on a stage out of doors, there to remain till the middle of October, they are then removed to the front of a cool green-house, exposed to as much light and air as can be given to them. With respect to watering, keep them rather moist than otherwise: when out of doors they are freely exposed to rain. The early flower-buds should be picked off until the space allotted is covered, the object being to have the greatest quantity of bloom at one time. When necessary, in their early growth, they may be stopped to give a supply of laterals. At all times they should have plenty of air and light, more especially after they show their flower-buds, for the joints will be shorter, and consequently the flowers more close together. When in bloom, care must be taken to shade from the midday sun, which will prolong their season of plenty: take off the weak laterals that are not likely to flower, where about two inches long; if with a heel so much the better. Any time from February till May fill the pot half full of crocks, then with a mixture

of peat and sand, till within two inches of the top, fill up with silver sand, and water with a fine rose to settle it. Then dibble in the cuttings all round, within one inch of the rim, leaving about half an inch of the cutting above the sand. Place the pot on a shelf in the front of the green-house, keep the sand constantly moist, taking care that the cuttings are always erect. In the course of two months many of them will throw up shoots from under the sand. The pot should then be removed to a shady situation out of doors. When the stems decay, do not disturb the sand, but water sparingly. In October let them be placed in the green-house, when all that have made small tubers will grow. It is from these plants the best cuttings are obtained in the spring. In the following May, turn the whole ball out of the pot, in a warm situation in the open ground. After they have finished their growth, take them up and sift the ball through a fine sieve, carefully picking out the tubers. They are then treated in all respects as the older tubers, and will make fine flowering plants the following spring. The seeds before sowing should be soaked in milk and water twenty-four hours, and the outer shell carefully removed; they will under this treatment grow much sooner and with greater certainty. They should remain in the seed pot until after they have formed a tuber. A small stick can be placed against each plant, to which it will climb, and it serves to indicate the place of the tuber when the stem is dead. Many seeds will remain twelve months before vegetating."—*Gard. Chron.*

T. moritzianum requires very similar treatment. Dr. Lindley directs that—"After this plant has bloomed, water should be gradually withheld from it, and the pot containing the tubers should be stored away in some dry situation, until the season for starting it into growth returns. The tubers should then be repotted and placed in a gentle heat."—*Gard. Chron.*

T. majus is the *Nasturtium* of our gardens. "The flowers and young leaves are frequently eaten in salads; they have a warm taste, like the common Cress, hence the name of *Nasturtium*. The flowers are also used as a garnish to dishes. The berries are gathered green and pickled, in which

state, they form an excellent substitute for capers.

"It should be planted on a warm border in April, having soaked the seed in warm water for twelve hours. The usual mode of planting, is in hills three feet apart each way, four seeds in a hill; two strong plants are sufficient to remain; when they commence running, place brush around them to climb on. When the berries attain full growth, but whilst yet tender, they are plucked with the foot stalk attached, and preserved in vinegar."—*Rural Register*.

TROWEL. This implement, made of iron from twelve to six inches long in the plate, and half as broad, hollowed like a scoop, and fixed on a short handle to hold with one hand, is convenient in removing small plants, with a ball or lump of earth about their roots, lifting bulbous flower roots after the flowering is past in summer; planting bulbs in patches or little clumps about the borders, as also for digging small patches in the borders, for sowing hardy annual flower seeds; likewise for filling mould into small pots, stirring the surface of the earth in pots, and fresh earthing them when necessary. And such a trowel is likewise very convenient for pointing over or stirring the ground between rows of small close-placed plants in beds or borders; are made between about twelve inches long in the plate, and six broad, narrowing gradually to the bottom, the other six or eight inches in the plate, and four inches broad, narrowing considerably towards the bottom, to introduce between small plants.

TROXIMON. Two species. Hardy herbaceous perennials. Division. Common soil.

TRUE PARSLEY. *Apium Petroselinum*.

TRUE SERVICE. *Pyrus Sorbus*.

TRUFFLE. *Tuber magnatum*, Piedmontese Truffle; *T. Borchii*, Italy; *T. moschatum*, Musk Truffle, near Bath; *T. cibarium*, Common Truffle, England. But besides the tubers there are other edible fungi known as truffles, viz., *Hydrobolites tulasnei*, Spye Park, Wilts; *Melagonaster Broomeianus*, Red Truffle, near Bath.

These edible fungi have not yet been cultivated in England, though the Prussians have succeeded in making them a garden tenant, and Comte de Borch has been equally successful in Italy. The

latter cultivates the Piedmont Truffle, and his process is this:—He either employs the soil where the truffle is found, or he prepares an artificial soil of seven parts good garden earth; two, well pulverized clayey soil; and one, oak sawdust—intimately mixed. Decayed oak or beech leaves would be better probably than the sawdust. If the natural soil was used, he trenched it two feet, removing all the large stones, and adding oak sawdust, if necessary, and about one-tenth of powdered snail shells, if the soil was too stiff.

"Choosing an aspect rather exposed to the north than the south, where no reflected rays could fall upon it, with every precaution to insure its being thoroughly soaked with pure rain-water, and after waiting a day or two till it was in a proper state of moisture, he made rows half a foot deep, and in these, at six inches distance, he placed good and sound truffles, each of them being surrounded with two or three handfuls of oak sawdust, taking care to mark the rows accurately. Ridges were then made over each row, to prevent the truffles being injured by too abundant moisture. The bed was then left till the following autumn, with no other precaution than, in dry weather, to take care that it did not become too dry. The result, we are informed, was an abundant harvest, every year, from October to January."—*Gard. Chron.*

Bradley, writing, in 1726, of the cultivation of the truffle in England, says that—

"The truffle may be *easily* cultivated where there are woods or coppices of oak or hazel, and where the soil is not too stiff, or inclining to chalk. The soil where they are most found is a reddish sandy loam; this will then be the best for our purpose, especially if it has lain long uncultivated. When we are thus provided with the proper soil, we must be sure to let it lie undisturbed till we are ready to plant, which will be in the months of October, November, and December, if the weather be open; for then the truffles are to be found in their full ripeness, and then, likewise, one may find them in a state of putrefaction, which is the time when the seeds are prepared for vegetation. It is in the last state that one ought to gather truffles for planting, or at least they should be in perfect ripeness.

"The proper soil, and these rotten truffles, being found, we may begin our work as follows:—Open a spot of ground, of a convenient space, and take out the earth about eight inches deep, and screen it, that it may be as fine as possible; then lay about two or three inches thick of this fine earth at the bottom of the trench or open ground, and upon it lay some of the overripe truffles, about a foot and a half distance from one another; and, as soon as possible, prepare a thin mud, made of the screened earth and water, well stirred and mixed together, and pour it on the truffles till the open ground is quite filled up. By this means, in a few hours, the ground will be as closely settled about the truffles as if it had never been dug or disturbed at all, and you may expect a good crop in due time. You must, however, take care to choose your spots of ground in woods or coppices, or such places as are shaded with trees. Their favorite tree is the oak, or the ilex or evergreen oak, as the elm is the favourite of the Morille.

"Notwithstanding these statements, it is quite certain that, at present, the art of cultivating the truffle is not known in England; and it will remain unknown, probably, until we have discovered how its spawn can be prepared, as for cultivating the mushroom."—*Gard. Chron.*

Mr. Gower says he recommended an old truffle-hunter "to bury, at the proper depth, some of his truffles that were in a state of decay and unfit for the table, under one of the unproductive trees sufficient in stature and in umbrageous development. At the beginning of next winter, when his visit was repeated, he sought for Mr. G., and told him, with great satisfaction, that the scheme had answered; for he had found two or three pounds of excellent truffles beneath the hitherto barren tree. By following this example, proprietors of trees adapted to truffles, and where the proper trees have been planted, may, in a short period, do that which a lapse of years, unassisted, would not effect.

"Of all trees the cedar of Lebanon is the most favourable to the growth of the truffle."—*Gard. Chron.*

TRUMPET FLOWER. *Bignonia*.

TRUSS is the florist's name for what botanists call an umbel of flowers, a distinctive title for that mode of inflorescence where several flowers have their

stalks united at one common centre, and thus spring from the root or branch on one stem, as in the auricula, polyanthus, and cowslip. See *Pip*.

TUBE FLOWER. *Clerodendron si-phonanthus*.

TUBER *eibarium*, the well known truffle. It grows under ground, in light dry soils.

TUBEROSE. *Polyanthes tuberosa*. Dr. Lindley says that,—

"To flower the tuberose in the open air the bulbs should be started in a moderately warm frame, and planted out towards the end of May, in a sunny sheltered border. The bottom of the border should consist principally of well decomposed manure, and should be covered, to the depth of six inches, with light sandy loam, in which the bulbs should be planted. Success, in this case, will depend greatly upon the season, and upon having good bulbs, which should be planted just as they are received. When grown in pots the same soil should be used, the plants should be kept near the glass, and they should receive a liberal supply of water when growing."—*Gard. Chron.*

TUCKERMANIA *maritima*. Hardy herbaceous perennial. Division. Sandy loam.

TULBAGHIA. Five species. Green-house bulbous perennials. Offsets or seeds. Sandy loam and peat.

TULIPA. Twenty-four species. Hardy bulbous perennials. Offsets. Rich loam and sand.

TULIP. *Tulipa Gesneriane*. From this species are descended our innumerable garden varieties. Of these it is needless to do more than offer a selection; and the most judgmatist is the following, by Mr. Slater, florist, of Cheltenham Hill, near Manchester.

The first class contains all that are worthy of a place in any stand of twelve or twenty-four varieties, and possess every requisite of a fine tulip. In the second the varieties have either fine forms, but tinged stamens, or else have rather long cups and pure bottoms and stamen. Those in the third class are such as deserve a place in any collection, but are not calculated for a southern stage.

FIRST CLASS.

Rose.—*Aglaiä*; *Amelia*; *Bacchus*, *alias Atlas*, and *Rose Bacchus*; *Carnuse*

de Craix; Catalina, *alias* Ponceau tres Blanc, and Cerise Blanche; Cerise à belle forme; Galatea (Slater's); Triomphe Royale, *alias* Heroine, La Belle Nannette, and La Cherie; Madame Vestris, *alias* Clarke's Clio, and Goldham's Princess Sophia of Gloucester; Ponceau tres blanc (Dutch); Queen of Hearts (Franklin's); Rose Brillant.

Byblomens.—Anacreon (Slater's); Bijou des Amateurs; Byzantium (Laurence's); Camarine; Eveque d'Amboise; Holmes' King; Invincible (Franklin's); Mentor, *alias* Reine de Sheba; Musadora; Pandora; Roi de Siam, *alias* Acapulco; Salvator Rosa; Violet Cook; Violet Sovereign; Violet Quarto, *alias* Violet Alexander; Violet Brun; Zenobia (Slater's).

Bizarres.—Catafalque (Old Dutch); Charbonnier; Curion (Slater's); Duke of Hamilton (Slater's); Fabius (Laurence's); Glencoe; Iago (Laurence's); Marcellus; Napoleon (Walker's); Polyphemus, *alias* Goldham's Albion, Ulysses, and Nourri Effendi.

SECOND CLASS.

Roses.—Brulante Eclatante; Catharine; Cerise Royal, *alias* Manteau Ducal, Ponceau Brilliant, and Moore's Rose; Elizabeth Jeffries; Lady Crewe; Lady Middleton; Lac; Manon; Mason's Matilda, *alias* Strong's French Rose; Pretiosa, *alias* Thunderbolt; Queen Boadicea; Rose Camuse.

Byblomens.—Ambassador, *alias* Atlas and Rose Baccu; Bailleu van Menvede; Bienfait Incomparable; Beauty (Buckley's); Buckley's No. 46; Cleopatra; Comte de Provence; David, *alias* David Pourpre; Davy's Queen Charlotte; Duc de Bourdeaux; General Barneveld; Imperatrix Florum; Incomparable Daphne; Incomparable, (Rowbottom's, *alias* Haigh's); Lancashire Hero (Buckley's); Lord Denbigh; Lord of the Isle (Slater's); Lewold; Louis XVI.; Ne plus Ultra; Prince Elie; Queen Victoria (Wilmer's); Rubens; Sir E. Knatchbull; Thalia (Clarke's); Violet Sovereign.

Bizarres.—Charles X., *alias* Waterloo, Bartlett's Platoff, La Conquerante, Gabel's Glory, Royal Sovereign, and Duke of Lancaster; Catafalque Surpasse; Carter's Leopold; Donzelli, *alias* Wells' Lord Brougham; Leonatus Posthumus; Lord Milton; Lord Lilford; Leonardo da Vinci; Optimus (Hutton's), *alias* Surpasse Optimus; Richard Cobden; San-

zio, *alias* Abercrombie, Captain White; Strong's Admiral White, and Strong's Admiral Black; Shakspeare, *alias* Garrick and Edmund Kean; Strong's King.

THIRD CLASS.

Roses.—Admiral Kingsbergen; Alexandre le Roi; Camillus; Claudiana; Comte de Vergennes; Duchess of Clarence; Emily; Fleur de Dame; Grand Roi de France; Incomparable Hebe, *alias* Iphigenia and Rose Hebe; Lady Wilmot; La Vandyke; Lavinia (Clarke's); Lilas en Cerise; Maria (Goldham's); Mary Ann (Lawrence's); Rose Monty, Rose Bianca, Rose Quarto, Rose Primo bien du Noir, and Rose Unique; Sarah (Lawrence's); Strong's Daphne, very like if not the same as La Vandyke; Thalestris; Vesta; Walworth, *alias* Glory of Walworth, and Glaphyra.

Byblomens.—Alexander Magnus, *alias* Alcon and Grand Marvel; Angelina; Bagnel, called also Black Bagnel; Baluruc; Black Tabbart; Catharina; Chef d'œuvre; Competitor; Czarine; Ely's Queen Victoria; Fair Flora (Buckley's); Glory (Buckley's); Grotius; Imperatrice de Maroc, *alias* Lady of the Lake, and Valerius Publicola; Imperatrice des Romaines, *alias* Duchesse de Modena; Incomparable Premier Noble, *alias* Grand Czidt; La belle Narene; La Mere Bruin Incomparable; Laurence's Friend; Nectar; Passe Reine d'Egypt; Patty (Lawrence's); Queen of Beauties; Queen Charlotte; Reid's Sir John Moore; Reine d'Hongrie; Reine des Tulips; Roscius; Superbein Noir, *alias* Lysander Noir; Transparent Noir; Washington, *alias* Rodney; Violet à belle forme, Violet Imperial, Violet Pompeuse, Violet Rougeatre, Violet Triumphant, and Violet Wallers.

Bizarres.—Bolivar (Lawrence's); Carlo Dolci; Catafalque Supérieure; Duke of Wellington; Emperor of Austria; Jubilee (Rider's); Sir Sidney Smith, *alias* Magnum Bonum, Trebissonde, Demetrius, and Franklin's Washington; Osiris; Prince Albert (Groom's).—*Gard. Chron.*

It will be observed, that tulips are divided into different classes, and as the characteristics of these, as well as some other terms applicable to these flowers, may not be understood by all readers, they are here defined.

Florists call tulips *seedlings* until they

have bloomed; after this those preserved on account of their good form and habit, as well as the offsets they produce, are called *breeders*. After some years the petals of these become striped, and they are then said to be *broken*. If the striping is good, they are said to have a *good strain*; if it be inferior, they are described as having a *bad strain*. A *rectified tulip* is synonymous with a tulip having a good strain.

A *feathered tulip* has a dark-coloured edge round its petals, gradually becoming lighter on the margin next the centre of the petal; the feathering is said to be *light*, if narrow; *heavy*, if broad; and *irregular*, if its inner edge has a broken outline.

A *flamed tulip* is one that has a dark-pointed spot, somewhat in shape like the flame of a candle, in the centre of each petal.

Sometimes a tulip is both *feathered* and *flamed*.

A *Bizard tulip* has a yellow ground, and coloured marks on its petals.

A *Byblomen* is white, marked with black, lilac, or purple.

A *Rose* is white, with marks of crimson, pink, or scarlet.

Characteristics of Excellence.—A tulip, however coloured, should be composed of six petals, three outer and three inner, which should be alternate, and lie close to each other; broad and round on the top, quite smooth, and of sufficient width to allow the edges to lie over each other when fully expanded. They should be firm in texture, having a slight swell towards the lower part of the midrib of the petal, which will enable it to retain its shape; this in a fully expanded flower should be semi-globular, the stalk being inserted in the pole, which should be a little depressed. The petals should be level on the top, the inner three of the same height as the outer; the latter should not be bent back, as is the case in some flowers. The colour of the ground should be pure and rich, the base of the petals without stain, and the yellow ground should possess the same intensity of colour on the outer as on the inner side of the flower. In the three principal classes, namely, roses, bizards, and byblomens, the colours should be brilliant, and well defined. In Mr. Groom's opinion, the feathered flower is most preferable; the feathers

should commence at the bottom of each petal, the deepest marking being on the top, and equal in every one. The flamed flower should likewise possess this feather; with a rich beam up the rib of each petal, branching off on either side, touching the feather, and at the same time preserving sufficient of the ground colour to show it to advantage. A flame without a feather, in general, presents a star-like appearance, which, though not so correct as the other, is still beautiful. The stem should be elastic, neither too tall nor short for the size of the flower, and sufficiently strong to keep itself erect without support. The edge of the petals should be unbroken, their greatest width near the top, which would prevent all quartering (a term which in reality means dividing in four), whereas the tulip parts into six, and it would be better in Mr. Groom's opinion if sextalizing, or some more proper term were substituted.—*Gard. Chron.*

Soil and Situation.—The best soil is formed of good turfy loam from a pasture. Some very old cow-dung, say two years old, and road scrapings, in the proportions of three or four barrowfuls of the loam to one of the others. The best aspect is south-west; the beds should be upon an open space, eight yards at least from any wall, to avoid the reflection of the sun. The soil should be free from manure, rich, and rendered light by well working it.—*Gard. Chron.*

Propagation.—By Seed.—An excellent French authority gives these directions:—"When the ripeness of the tulip seed, where the flower has bloomed in a full exposure, is indicated by the opening of the capsule, it is cut off a few inches below the head, and placed in a very dry situation, in order to insure its perfect maturity. This being accomplished, the seeds are taken out, and should be sown, about the middle of October, in a bed of well prepared earth, which has been passed through a coarse sieve, and covered about the eighth of an inch in depth with soil of a fine and light texture, which will allow the free vegetation of the seeds without incrusting or becoming hard. The beds must be protected from sharp frosts by covering them with leaves or with mats, and likewise kept perfectly free from weeds. If these necessary precautions

are attended to, the tulips will come up towards the end of February. From the size of a small pea in the first year, the roots will increase considerably during the two following seasons, and each time when the leaves fade, I spread over my seedlings about an inch in thickness of similarly prepared soil to that with which the seed was covered, being satisfied, that from the loss of time and the greater extent of land they will occupy by taking them up in the second year and replanting them, it is the better plan to allow them to remain till they have made their third growth.

"I do not take up mine until that time, and in a few days afterwards I replant them about two or three inches in depth, and about three inches apart from each other, in a well prepared bed. Lastly, in every succeeding year, I set them in fresh soil, being convinced that they attain their full size much sooner when treated in this manner, especially if sand has been mixed with it, or lime rubbish, which has been enriched with good rotten manure or vegetable soil."—*Gard. Chron.*

By Offsets.—The same practical horticulturist observes, that—

"The side bulbs always reproduce flowers identically with those from which they derived their origin. Their period of blooming varies according to their size; it occasionally happens in the first year, but sometimes it is six or seven years before they flower. During August the bed must be prepared for their reception; and in September they must be planted from two to four inches apart, according to their size. Should their planting be deferred till November, it is very possible that many of the smaller ones will shrivel and perish. When they are put into the ground or taken up, the same system is followed as in the main collection, so that all mistakes may be avoided, and by that means the amateur will be able to replace any bulbs which by accident or otherwise he may have lost in his choice or best beds."—*Gard. Chron.*

Planting in Beds.—On this part of their culture the best practical information is given by Mr. Glenny. He says—

"A bed properly arranged consists of seven long rows, of which the tallest tulips should be the middle, and shorter ones nearer the sides. Tulips are, on

account of their different heights, called first row, second row, third row, or fourth row flowers; the first row being nearest the sides, and the fourth row being in the middle; of course, both sides being alike. There are but four heights recognised. Although we have said a bed should consist of seven rows, to make the matter plain to those who have not grown a bed of tulips, every seven which cross the bed is called a row; and among tulip growers, wherever they speak of a row, they mean the row of seven which crosses a bed, all these sevens being numbered from 1 to 50, as distinct rows, or up to the full number, whatever it may be. Tulips should be always planted six inches apart every way, consequently a bed of twenty-five feet would take fifty rows of seven each. The tulips required will be 50 fourth-row flowers, 100 third row, (there being two rows alike of the other heights) 100 second row, and 100 first; and each of these ought to comprise, as nearly as may be, one-third of each class.

"There should be a few over of each to guard against accident. The parties who supply the tulips should not only send the names attached to each, but their classes also.

"Mark a space twenty-five feet long and four feet broad, and lying as near as may be convenient north and south. Dig this clean out to the depth of three feet.

"If the soil at the bottom is sour or wet, make a drain from the bottom to the nearest place at which the water can escape; this drain should be made by cutting a trench even with the bottom of the bed all the way to the proposed outlet, half filling it with large stones, broken pots, or (for want of harder and more lasting substance) with faggot wood, and fill up the trench with the soil of the garden.

"If the bottom of the tulip bed should be gravel, there will require no artificial drainage. On the bottom of the bed spread a foot of the common soil of the garden; the real depth of the bed required for the tulips is but two feet; but in clearing away all that might prove noxious, and making the ground sound and sweet, by throwing in a foot of good garden soil, an excellent bottom is made, which will not again have to be disturbed.

"If the bottom be wet and sour, and you have drained it as before denoted, let there be a good six inches of brick rubbish, or broken flower pots, or both, put at the bottom, and about six inches of the common garden soil upon them.

"The pit for the bed being now prepared for filling, spread dry cow-dung, six inches thick, at the bottom; let it be trodden down, and throw maiden loam, as already described as the top spit of a meadow, with the turf rotted in it; fill up the bed to eight inches above the surface, drive down at each corner of the bed a stake, to mark the exact size the bed should be, that is, the two end stakes four feet from each other, and from one end to the other twenty-five feet; and let these stakes stand exactly square, one foot above the surface of the path, and perfectly level.

"If you design to have the sides boarded, which saves much trouble, your best way is to let the carpenter adjust the boards very nicely as to level, to let them go down at least six inches below the surface of the garden or path, and stand eight inches above it; he must then provide a three-inch width, to fit on and take off at pleasure, because it is of the greatest service in planting. The most simple way of planning this is with bolts; the boarding should be an inch thick, staples should be placed both in the fixed and in the moveable board, opposite each other, at proper distances.

"The whole should be covered from heavy falls both of rain and snow; and from the moment the bulbs are in the ground, have none but genial showers, and not much rain of any sort. We would never see the bed dry, but should be quite as unwilling to see it too wet."
—*Gard. and Pract. Flor.*

Should very severe frosts occur during the winter, cover the bed all over a few inches thick with sawdust, which, if dry, the frost never penetrates. When the frost is over, take away the sawdust, and sift a little fresh soil over the surface of the bed.

Shade.—Tulips cannot be grown more advantageously than in two beds, arranged and sheltered according to the plan of which the following is an end view. But whether grown in two beds or in one, highest in the centre, as before mentioned. The edges of the beds

Fig. 172.



should be supported by deal planking two inches thick, and painted green, surmounted by a wire trellis, thirty inches high, coloured similarly, and supporting arches of wire to bear a canvas covering, when shade is required. These wire arches fit into sockets in the upper rail of the trellis, and the canvas cover is fastened to them by strings, as in the case of a tent bedstead.

The wire trellis will preserve the plants from boisterous winds during all periods of the growth, and the whole will be found to be the most efficient shelter, at a moderate expense that combines elegance with utility. The first fortnight of the month of November is the best season for planting. A hole should be made with a trowel, not with a dibble, a little sand be placed beneath and over each bulb, and a small hillock marks on the surface its place.

The only after culture required is a frequent hoeing of the surface of the bed; and as the flowers fall, to cut off the seed pod.

Taking up the Bulbs.—This must be done as soon as the leaves in early autumn become yellow. Mr. Glennly says—

"If you have room and convenience, put them into boxes, with all their skins and roots, and place the drawers singly in an airy dry covered place out of the sun. In a few days they will harden, the skins will come off easy, and the root break away without damaging the bulb. Should any in taking up be found with moist or mildewed skins, which is not unfrequently the case, they should nevertheless be let alone a day or two; the removal of the skins, stalks, and roots is accompanied with much less risk. It is not uncommon for part of the top to come away with the roots, if the latter is broken off at the time of taking up in temporary boxes at first, so that as they are cleared of their skins and roots, they may be laid away

in their own drawers perfectly clean, which is not easily done if they are taken out to clean and returned to the same place, because there will be grit and mould not easily got rid of. Tulips when put away, should have air, without heat, or much frost; an outhouse of any kind is better than a dwelling-house. There should be a vacancy between all the drawers, and the case all round should have wire panel sides, back and front."—*Gard. and Pract. Flor.*

TULIP TREE. *Liriodendron.*

TUPA. Six species. Half-hardy herbaceous perennials. Division and seed. Light, rich, or peaty soil.

TURF may be obtained either by sowing grass seeds, or laying turf obtained from a common or down; and if the latter mode can be adopted, it is the best, as the turf is obtained at once, and more regular than can be under the best circumstances from seed.

All the preparation of the soil required is to dig it level, a spade deep, provided the subsoil is open, otherwise to have a good drainage effected (see *Draining*); to have all large stones removed from the surface, and to have it brought to a perfect level, by repeated rollings, and filling up the hollows when necessary, as indicated by the level. The surface being then loosened by raking, is ready for the seed or turf.

By Seed.—"Never use that from a haystack, for it will have mixed with it the seeds of weeds; but buy of respectable seedsmen, as much as you require. For this purpose the best are *Poa pratensis*, green or spear grass; *Poa compressor*, blue grass; *Anthoxanthum odoratum*, sweet scented vernal grass:—either of the above, mixed with a small proportion of white clover, will form a permanent and pleasing sward.

"Sow evenly, and rake well in, and roll. When the grasses come up, the ground should be carefully gone over, and cleared of all weeds and spurious grasses, as they appear. Strict attention to this will do much to ensure the future excellence of the lawn. During the first season after sowing, the grass may be mown three or four times, but not in hot dry weather; and afterwards, the oftener it is rolled and mown the better."—*Gard. Chron.*—*Gard. and Pract. Flor.*

By Turf.—The season for laying turf is any time from September till April

or May, though it will grow at almost any time of the year, even if there is occasion to lay it in summer, and dry weather succeed: for although it will open at the joints, and turn brown, as if dead, yet, after the first rain it will close again, and resume its verdure.

The turf for this use is cut with an iron instrument called a turving iron, observing to cut the pieces all an equal width, length, and thickness—the proper size is a foot wide, a yard long, and about an inch thick; they should be first marked by line, the proper width, length, and depth with a *racer* or *rutter*. Racing them first longwise a foot wide, then across in yard lengths; then proceed to cut them up, having particular regard to cut them level, and equal in thickness, otherwise it will be impossible to lay them level. As you cut, a man or boy should roll each turf up close and tight, the grass side inwards, and pile them up by tens, especially if they are cut by the hundred. They are to be laid regular, turf and turf, unrolling them as you lay them, joining them up quite close edge to edge, making good all deficiency of broken parts as you go on; and as soon as laid, it should be well beaten with broad heavy wooden beaters, being flat pieces of elm or oak plank, two inches thick, fifteen or eighteen inches long, and a foot broad, having a long handle fixed slanting in the middle of the upper side; and with these, beat the grass regularly all over, and then roll it well with a heavy roller, observing the beating and rolling should be repeated in moist weather.

"If very dry hot weather succeeds, so as to occasion the turf to shrink and open at the joints, a good watering will be of much advantage."—*Abercrombie.*

By Inoculation.—If turf is scarce, cut turves into pieces, about three inches square, and plant these, green side up, pretty thickly over the space intended for the lawn. Beat them down into the soil, and water freely, roll frequently, and water also in dry weather. The turf will soon be as close, and the sward as perfect, as if the ground had been entirely turved.

TURF ASHES. See *Ashes.*

These, which are the basis of charred turf, now becoming so usual a manure, are, according to M. Sprengel, thus constituted:—

Silica 93.10

Alumina	1.35
Oxide of iron	1.73
— manganese	0.32
Lime	0.62
Magnesia	0.33
Potash, combined with sulphuric acid	0.38
Common salt	0.08
Sulphuric acid, combined with potash and lime	1.70
Phosphoric acid, combined with lime and magnesia	0.39

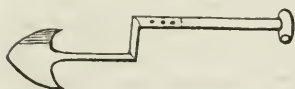
TURF TOOLS are the *Racer* or *Rutter*, for cutting the edges of turf after it has been laid, and for cutting the outlines of the turves when first obtained. It is a thin sharp edged implement, somewhat resembling a cheese-cutter, fixed to a handle about four feet long.

Fig. 173.



The *Turfing Iron* is for raising or peeling off the turves from the soil. It has an arrow-headed flat blade, with an angular handle, thus:—

Fig. 174.



A *Turf* or *Daisy Rake* consists of a piece of thin plate iron, cut into teeth, with two slips of ash, or other tough wood, between which it is firmly riveted to form a back, and keep it from bending. When put together, the back is an inch and a quarter thick. The wood is beveled to nothing, half an inch above the interstices of the teeth, at

Fig. 175.



which point the iron is slightly bent longitudinally to admit the thickness of wood underneath, and give a proper inclination to the handle. The instrument serves both as a grass rake and a daisy rake, and has the advantage over the daisy rakes in common use, of being easier cleaned, from the wideness of the interstices between the teeth.—*Gard. Mag.*

TURNER A. Eleven species. Stove annuals, biennials, and evergreen shrubs. *T. trioniflora* is an herbaceous perennial; and *T. racemosa* a hardy annual. Seeds, and the shrubby kinds by cuttings. Rich soil.

TURNIP. *Brassica rapa*. "The turnip is a biennial plant, growing in a wild state in some parts of England, but better known as an inhabitant of the garden and farm. There are an immense variety: to cultivate all is not so desirable as to plant such as are the more valuable. Those which we deem best for family use are the Early Dutch and Red Top, for autumn and early winter supply. The Yellow Aberdeen, Golden Maltese, Ruta Baga (or Swedish), are not so much esteemed in the autumn, but remain firm and solid until late in the spring, (when most other kinds have become pithy,) and are then fine. The Large Globe, and Norfolk Turnip, and the Ruta Baga, are principally cultivated for cattle.

"The main sowings of all the kinds recommended for family use, are made in the vicinity of Philadelphia from about the middle of August to the first of September. If sown earlier they are not so tender and finely flavoured, and if sown later do not generally attain full growth. The Ruta Baga, Globe and Norfolk require more time to perfect themselves; sow therefore about a month earlier. The more rapidly the root is produced the more tender and well flavoured it will be. Those which are intended for the spring supply should be topped very closely, else when the weather becomes mild, the crown will start, and the root soon gets pithy and unfit for use.

"Spring sowings seldom answer a good purpose: the Early Dutch and Red Top are, however, best.

"Should a long continued drought prevail at the time recommended for sowing in the autumn, some difficulty

may be experienced in getting the seed to vegetate, (unless it be small patches in the garden, which can be shaded and watered.) The only resource is, to make several sowings in freshly dug or ploughed ground.

"If the seed has lain long, say two or three weeks, without vegetating, should a shower come, the safer plan will be to re-plough or harrow the ground, and make a fresh sowing.

"Frequently the 'fly' proves very destructive, preying upon the young plants when in so early a stage that they can scarcely be seen without close inspection. To counteract them it has been recommended to soak the seed in sulphur water—an ounce of sulphur to a pint of water. A mixture of quicklime, ashes, and soot, sprinkled over them, is frequently effectual.

"The crop may be put in either broadcast, or in drills, raking the seed well in. The latter plan is the better, and if sown on very dry ground during hot weather, it is safer to roll the land immediately afterward. *Observe*, the land cannot be too rich for this crop; old sod, or newly cleared land, produces the largest and finest flavoured roots."—*Rural Register*.

To obtain Seed, some of the most perfect roots of those which will withstand the winter may remain where grown; or they may be transplanted in February or March.

The plants must stand a foot apart each way; be carefully freed of weeds, and especial care taken to keep away birds, as they are particularly voracious of the seed of this, and of all other species of brassica. When ripe in July or August, the stalks are cut; and when perfectly dry, the seed beaten out and stored. No two varieties must be allowed to grow together.

Manures.—The best manure for turnips is stable dung; and next in their order, guano, super-phosphate of lime, soot, and salt.

For the injuries to which the turnip is liable, see *Athalia*, *Ambury*, and *Black Fly*.

Turnip-cabbage (*Brassica napo-brassica*), and turnip-rooted cabbage (*B. caulorapa*). These species of brassica are but little cultivated, and, at most, a very small quantity of each is in request. The bulbs, for which they are cultivated, must have their thick outer skin re-

moved, and, in other respects, be treated as turnips in preparing them for use.

Varieties.—Of the turnip-cabbage, which is so named on account of the round fleshy protuberance that is formed at the upper end of the stem, there are four varieties:—

1. White turnip-cabbage.
2. Purple turnip-cabbage.
3. Fringed turnip-cabbage.
4. Dwarf early turnip-cabbage.

Of the turnip-rooted cabbage, which is distinguished from the above by its root having the protuberance near the origin of the stem, there are two varieties, the white and the red.

Sowing.—They are propagated by seed, which may be sown broadcast or in drills, at monthly intervals, in small quantities, from the commencement of April until the end of June.

Planting.—The best mode is to sow thin, in drills two feet and a half apart, and allow the plants to remain where sown, the plants being thinned to a similar distance apart; or, if sown broadcast, to allow them to remain in the seed-bed until of sufficient size to be removed into rows, at similar distances, for production, rather than, as is the practice of some gardeners, to transplant them, when an inch or two in height, in a shady border, in rows three inches apart each way, to be thence removed as above stated.

Water must be given every night after a removal until the plants are again established; and afterwards, in dry weather, occasionally as may appear necessary.

Earth may be drawn up to the stem of the turnip-cabbage as to other species of brassica; but the bulb of the turnip-rooted must not be covered with the mould. For directions to obtain seed, &c., see *Brocoli*, *Turnip*, &c.

TURNIP-FLY. See *Black Fly*.

TURNSOLE. *Heliotropium*.

TURPENTINE. *Silphium terebintha-ceum*.

TURPENTINE MOTH. See *Tortrix resinella*.

TURPENTINE TREE. *Pistacia terebinthus*.

TURRÆA. Five species. Stove evergreen trees. Cuttings. Loam, peat, and sand.

TUSSILAGO. Twelve species.

Hardy or half-hardy herbaceous perennials. Division. Common soil.

TWAYBLADE. *Listera*.

TWEEDIA. Two species. Hardy deciduous twiners. Cuttings or seeds. Sandy loam and peat.

TYLOPHORA. Three species. Stove evergreen twiners. Cuttings. Peat and loam.

TYPOGRAPHY BARK BEETLE. See *Bostrichus*.

TYTONIA *natans*. Stove aquatic annual. Seeds. Rich loamy soil, in water.

ULCER. See *Canker*.

ULEX. *Furze*. Four species. Hardy evergreen shrubs. *U. Europaea* is increased by young cuttings, and all by seeds. Common light soil.

ULMUS. Elm. Thirteen species and many varieties. Hardy deciduous trees. Layers or grafts. Common soil. *U. integrifolia* is a stove evergreen tree. The Wych elm (*U. montana*) is also propagated by seed ripened here.

UMBILICUS. Four species. Hardy and half-hardy herbaceous perennials. Offsets, cuttings, and seeds. Loam, peat, and sand.

UMBRELLA TREE. *Hibiscus guineensis*.

UMBRELLA WORT. *Oxybaphus*.

UNCARIA. Two species. Stove evergreen climbers. Cuttings. Peat and loam.

UNDER-GROUND ONION. See *Potato Onion*.

UNONA. Ten species. Stove evergreen shrubs, trees, and climbers. Ripe cuttings. Light turfy loam.

URANIA *speciosa*. Stove herbaceous perennial. Newly imported seeds. Turfy loam and peat. It requires to be well watered.

URARIA. Six species. Stove and green-house evergreen shrubs, except *U. lagocéphala*, a stove herbaceous perennial. Seeds or young cuttings. Loam, peat, and sand.

UREDIO. See *Barberry* and *Mildew*.

URINE. See *Dung*. The urine of all animals is excellent as a manure; but it must be given only to plants whilst growing, and in a diluted state. One of the most fertilizing of liquid manures is composed of cabbage-leaves, and other vegetable refuse, putrefied in the urine from a house or stable, and diluted with three times its quantity of water when applied. If mixed with

bleaching powder (chloride of lime), there will be no offensive smell. Gypsum mixed with urine, or a little oil of vitriol poured into it, adds to its utility as a manure. Sulphate of iron, in the proportion of seven pounds to every hundred of urine, prevents the escape of ammonia during putrefaction.

UROPETALON. Six species. Half-hardy and green-house bulbous perennials. Offsets and seeds. Loam and leaf-mould.

UTRICULARIA. Hooded Milfoil. Three species. Hardy aquatic perennials. Division. Water.

UVARIA. Six species. Stove evergreen shrubs; *U. zeylanica*, a twiner. Ripe cuttings. Sandy loam and peat.

UVULARIA. Six species. Hardy herbaceous perennials. Division. Light sandy soil.

VACCINIUM. Whortleberry. Thirty-two species and some varieties. Chiefly hardy deciduous shrubs; *V. caracasenum* and *V. meridionale* are stove evergreens; and a few are hardy and half-hardy evergreen trailers. Layers, seeds, and the stove species cuttings: sandy peat.

VALERIANA. Valerian. Nineteen species. Hardy herbaceous perennials, except *V. capensis*, which belongs to the green-house, and *V. sisymbriifolia*, is a hardy biennial. Division. Loam, peat, and sand, for the natives of warm climates, and common soil for the hardy species.

VALERIANELLA. Three species. Hardy annuals. Seeds. Common soil.

VALLARIS *pergulana*. Stove evergreen twiner. Cuttings. Sandy loam and peat.

VALLESIA. Two species. Stove evergreen shrubs. Cuttings. Sandy loam and peat.

VALLISNERIA *spiralis*. Green-house aquatic perennial. Seeds. Water.

VALLOTA *purpurea*, and its variety. Green-house bulbous perennial. Offsets. Peat and sand.

VANDA. Five species. Stove epiphytes. Division. Wood, and some of the stronger kinds, sphagnum and potsherds.

VANDELLIA. Four species. Stove annuals, except *V. hirsuta*, which is hardy. Seeds. Sandy loam.

VANGUERIA. Three species. Stove

evergreen shrubs. Cuttings. Loam and peat.

VANILLA. Three species. *V. bicolor*, a stove epiphyte, increased by division, and growing on wood. The other two increase by cuttings. Moss and turfy peat.

VARIEGATION is the colour of leaves different from green, such as "the silvery and golden margins, and varieties of spots, which are common among garden plants, as in myrtle, sage, ivy, holly, the *Agave Americana*, *Sempervivum arboreum*, and many of the *Pelargonias*. These spots are not diseases, for the whole plant has all the signs of being in a perfectly healthy state. But neither are they effects of a law of nature, like the spots of *Orchis maculata*, and the red-coloured leaves of *Caladium bicolor* and *Amaranthus tricolor*, inasmuch as they are not continued by propagation by seed. Such discoloured spots are incapable of performing the usual function of leaves, namely, the exhalation of oxygen gas."—*Decandolle*.

Yet this variegation does not render the plant more tender; for the variegated holly and ivy are as hardy as those with leaves entirely green.

VASCOA. Two species. Green-house evergreen shrubs. Young cuttings. Loam and peat.

VEGETABLE MANURES. See *Green Manures*, *Ashes*, *Manures*.

VEGETABLE MARROW. See *Gourd*.

VELEZIA rigida. Hardy annual. Seeds. Light soil.

VELLA Pseudo-cytisus. Cress Rocket. Green-house evergreen shrub. Young cuttings. Common soil.

VELLEJA. Three species. Green-house herbaceous perennials. Division or seeds. Loam, peat, and sand.

VELTHEIMIA. Three species. Green-house bulbous perennials. Offsets. Light loamy soil.

VENTILATION. See *Stove*.

VENUS'S COMB. *Scandix pecten-veneris*.

VENUS'S FLY-TRAP. *Dionaea muscipula*.

VENUS'S HAIR. *Adiantum capillus-veneris*.

VENUS'S LOOKING-GLASS. *Specularia perfoliata*.

VENUS'S NAVELWORT. *Omphalodes*.

VEPRIS obovata. Stove evergreen shrub. Cuttings. Peat, loam, and sand.

VERATUM. Six species. Hardy herbaceous perennials. Division or seeds. Rich soil.

VERBASCUM. Sixty-four species. Chiefly hardy biennials, and a few herbaceous perennials. *V. spinosum* is a half-hardy evergreen shrub; *V. haemorrhoidale*, and *V. pinnatifidum*, are green-house biennials. Seeds; the perennials by division. Common soil.

VERBENA. Vervain. Thirty-two species. Hardy, half-hardy and green-house herbaceous perennials, and hardy and half-hardy annuals and biennials. These latter increase by seed, the perennials by cuttings. Light loam.

Choice Varieties are—

Scarlet.—*V. Atrosanguinea*; *V. Boule de Feu*.

Orange Scarlet.—*V. formosa elegans*; *Gladiator*.

White.—*Princess Royal*; *Monarch*; *Alba magna*.

Purple.—*V. Stewartii*; *Emma*.

Reddish Purple.—*V. rubra*; *V. purpurea*; *Renown*; *V. rubescens*.

Ruby.—*Defiance*; *Ruby*.

Rose.—*Bridesmaid*; *Wood's Princess Royal*; *Beauty*; *Supreme*; *Teuciodes Rosea*; *Rose d'Amour*.

Mulberry.—*Mulberry*.

Cream.—*V. lutescens*.

Lilac.—*Messenger*; *Giant*.

Propagation.—*By Seed.*—Sow towards the end of February in shallow pans, to be placed in a gentle heat. The seedlings may be planted out in summer in a warm part of the garden, where they will flower in the autumn.

By Cuttings.—In the last week of August or first week of September, take cuttings from laterals not in bloom. Pot them in sixties, filled firmly with sandy loam and leaf-mould; water and plunge in a hot-bed, temperature not more than 45°, under a hand-glass, shading from sunshine, and when rooted pinch off their tops.

By Layers.—*Verbenas* in the open borders are readily propagated by pegging down the laterals in September in pots filled with earth and sunk into the bed near the plants. The layers will be rooted in about six weeks, when they may be separated from the parent plant. Put them into a gentle heat, re-pot them, and keep through the

winter in a cold frame, giving very little water during that season.

General Culture.—Mr. G. Fielder, gardener to W. Brisco, Esq., of Hastings, says that six plants of a kind are usually enough to obtain cuttings and layers from for bedding out. His mode of proceeding is as follows:—

“In the first or second week in July strike in sixty pots as many cuttings of the different kinds as required for filling the beds in the following year, about six pots of a sort being usually sufficient. Early in August, the pots being filled with roots, prepare as many boxes, two feet square sorts, filling one-third of each box with broken tiles, and the rest with one part sand, one leaf-mould, and two parts good rich loam. Plant in them at equal distances apart, and the shoots being pegged down they soon take root all over the box, and form one mass. Place in a cold frame during the winter, and the lights thrown off except in wet or frosty weather. Early in the spring they begin to make young shoots, which pot in sixty pots and strike in a cucumber frame; these will be ready to plant out by the end of April, at which time the boxes are turned out, one side being removed and the mass planted in the centre of a bed. The bed is then filled up with the young plants from the sixty pots; those out of the boxes, being oldest and strongest, take the lead and keep it.”—*Gard. Chron.*

In Pots.—Some of these trained over a trellis should always be on the green-house. All the particular attention required is that they should be kept regularly shifted into pots of a larger size as they require it, and should be grown either in a pit or green-house, where they receive the full benefit of the sun and air. Any free rich soil will suit them.

Such are the directions for its culture as given in the English edition of this work. In the United States the climate is more favourable for the *Verbena*, and when turned out in an open border early in summer, the only care requisite seems to be lest it take entire possession of the garden.

VERBESINA. Eight species. Green-house and hardy herbaceous perennials. *V. boswallia* is a green-house annual, and *V. atriplicifolia* an evergreen shrub. Division. Light rich soil.

VERNONIA. Fifteen species. Hardy green-house and stove herbaceous perennials, and stove evergreen shrubs. *V. linearis* is a stove annual. Seeds and young cuttings, and the herbaceous kinds by division. Light rich soil.

VERONICA. Speedwell. One hundred and twenty-five species. Chiefly hardy herbaceous perennials. Some are deciduous trees and trailers, and a few evergreen shrubs and creepers. The green-house shrubs increase by cuttings. The hardy annuals by seeds. The herbaceous by division. Common soil suits them all.

VERVAIN. See *Verbena*.

VESICARIA. Nine species. Hardy and half-hardy annuals, biennials, herbaceous perennials, and evergreen shrubs. Seeds. Sandy loam.

VESTIA lycopoides. Green-house deciduous shrub. Cuttings. Peat and loam.

VIBORGIA. Two species. Green-house evergreen shrubs. Young cuttings. Sandy loam and peat.

VIBURNUM. Twenty-seven species and some varieties. Hardy deciduous and evergreen shrubs; a very few belong to the stove and green-house, and one or two are half-hardy. Layers or cuttings. Peat and loam; *V. opulus* is the Guelder Rose.

VICIA. Vetch. Seventy-seven species. Chiefly hardy annuals and climbing annuals or deciduous climbers. Seeds: and the few perennial kinds by division and seeds. Common soil.

VIEUSSEUXIA. Eleven species. Green-house bulbous perennials. *V. glaucopsis* is half-hardy. Offsets or seeds. Peat, loam, and sand.

VIGNA globea. Hardy training annual. Seeds. Common soil.

VIGUIERA. Two species. Stove herbaceous perennials. Cuttings. Sandy peat and loam.

VILLARSIA. Ten species. Hardy, half-hardy, green-house and stove aquatic and herbaceous perennials. Division or seed. Peat and sand; and the perennial, or marshy kinds, in pots placed in water.

VILMORINIA multiflora. Stove evergreen shrub. Seeds and cuttings. Loam, peat, and sand.

VIMINARIA. Two species. Green-house evergreen shrubs. Cuttings. Light loam and peat.

VINCA. Periwinkle. Three spe-

cies and several varieties. Hardy evergreen trailers. Division. Common soil.

VINE. *Vitis vinifera*. See *Grape Vine*.

VINE BOWER. *Clematis Viticella*.

VINE LEEK. *Allium ampeloprasum*.

VIOLA. Violet. Ninety-nine species. Chiefly hardy herbaceous perennials, annuals, deciduous and evergreen trailers, a few are half-hardy, and a few others belong to the green-house. The herbaceous kinds increase by division or seeds: the shrubs by cuttings. The annuals by seeds. Loam, peat, or leaf-mould, and sand suits them best.

VIOLET. *Viola odorata*.

Varieties.—The best are *Neapolitan*, double pale blue; *Russian*, blue; *Tree Violet*, semi-double, blue, stem eighteen inches high. *Double Blue*; *White*; *Pink*.

Soil.—All the varieties prefer a light rich soil on a well drained subsoil. Stable manure makes them too luxuriant; and when they require the addition of a fertilizer, none is so beneficial as leaf-mould, or the bottom of an old wood stack.

Propagation.—*By Division*, &c.—They all multiply by parting the roots, and by their side shoots rooting in the earth. They may be parted or slipped in spring, summer, or autumn, as soon as they have done flowering, in moist weather. Each plant may be slipped or divided into several slips, not too small; and planted either at once to remain, or the weakest may be planted in nursery beds; and in either method each slip will soon increase into a large tuft, and flower abundantly the next year.

By Seed.—Sow it either soon after it is ripe, or early in the spring, in a bed or border of light earth, and raked in; and when the plants are come up an inch or two high in summer, prick them out in a shady border to grow till October, and then plant out to remain.

Pink Violets.—The best time to plant them is in September, but they should be planted in a dry situation, and not fully exposed to the sun at any part of the day. The principal points to attend to are, never to disturb them by clearing or digging about them, and always to plant them in a shaded place.

Russian and Neapolitan Violets.—

There are two double varieties of the *Russian*, the purple and the white. At the close of autumn, in a rich yet light soil, some year-old plants of each variety should be planted, some in a border which is exposed to the full meridian sun; some in a border which only receives its morning rays; and a third quantity in pots on a north border. The only attention they require is to keep them free from weeds, and to remove all runners as they appear. These will bloom in succession from March until the end of May; and if those in pots in the north border are prevented from blooming by having their flower-buds picked off as they appear until late in May, and are then plunged in the border which enjoys the morning sun, they will, if carefully watered and attended, bloom in June and early in July. The double purple may be most successfully cultivated in this way. For forcing, Mr. Ayres directs some year-old plants of the *Neapolitan* varieties to be taken up after having done flowering, and planted in a light rich border, a foot apart each way, care being taken to remove all runners, but to injure the roots as little as possible. A copious watering is to be given at the time of planting; they should be shaded through the summer, and all runners removed as they appear. In September, the *Neapolitans* with good balls of earth are to be placed in forty-eight or thirty-two size pots, and removed into a gentle hot-bed, and protected by a frame. If air be admitted freely and the heat be kept up very gently, these may be brought to bloom in February. Another mode of making the *Neapolitan* violet bloom during the winter is to plant some of the runners at the end of April, in small pots filled chiefly with leaf-mould, watering them until rooted, and then moving them to a cold shaded place, as the north side of a wall—the colder the better. In October bring them under the sunny side of the green-house, or into an empty frame to be closed at night, and then move them the second week in December into a sunny window or green-house. They will bloom in January, and for some months after, by having a proper succession.

Dr. Lindley says—"To have *Russian* violets in flower during winter, you must treat them in the following man-

ner: as soon as they have done flowering, about March, sift a little light soil over them, and encourage their growth as much as possible, to obtain early strong rooted runners from the old plants, which if properly managed will be about the end of May. Transplant the young runners into a nursery-bed in a rather shaded but not confined situation. The soil should be fresh sandy loam and peat, with a small portion of leaf-mould, but by no means made rich with dung, as that causes the plants to grow too vigorously. About the beginning of August prepare a place for their final reception, an old cucumber or melon bed will do well, taking away the soil from the frame, and filling the place with a mixture of good loam and sandy peat, adding about one quarter of well rotted cow-dung to it, well water the whole, and let it remain for a few days to settle. After this remove the young plants from the nursery-bed with good balls, and plant them in rows about six or nine inches apart each way, and afterwards place the lights on for a few days until the plants recover the shift. They will afterwards require no further trouble except watering and keeping free from slugs and weeds, which must be attended to. When the weather becomes cold in the autumn, the lights must be put on during the night, and in rough wet weather; and finally the violets must be well protected from frost during winter, by covering them at all times when the weather will permit, to prevent their damping off. Treated in this way, they will then flower freely from December to February. They may also be potted and cultivated in the same manner, and when in flower may be planted in the green-house; but they will not bloom during the winter, if exposed to the inclemency of the weather, or if in a damp situation."—*Gard. Chron.*

Water should only be applied to them when they really want it, and then it should be given freely, and early in the morning, so that the plants may have plenty of time to dry before the frame is closed.

Tree Violet.—This requires to be potted in a mixture of peat and sandy loam, and requires no further attention than to be kept in a shady part of a green-house; supplying it plentifully with water and air.

VIOLET THLASPI. *Clypeola lon Thlaspi*.

VIORNA. *Clematis viorna*.

VIPER'S BUGLOSS. *Echium*.

VIPER'S GRASS. See *Scorzonera*.

VIRGILIA. Six species. Green-house evergreen shrubs, except *V. lutea*, a hardy deciduous tree. Young cuttings. Loam, peat, and sand.

VIRGINIAN CREEPER. *Ampelopsis hederacea*.

VIRGINIAN POKE. *Phytolacca decandra*.

VIRGIN'S BOWER. *Clematis Viti-cellæ*.

VISCARIA. Three species. Hardy annuals. Seeds. Common soil.

VISCUM album. The *Mistletoe*. Parasite, increased by putting the berries on trees after cutting the bark. See *Mistletoe*.

VISMIA. Three species. Stove evergreen shrubs. Young cuttings. Loam and peat.

VITEX. Twelve species. Stove, green-house and hardy evergreen shrubs and trees. Cuttings. Loam and peat, and the hardy kinds of common soil.

VITIS. Eleven species and some varieties. Hardy deciduous or stove evergreen climbers. *V. vinifera* is the common grape vine: seed, cuttings or layers. Strong rich soil. See *Grape Vine*.

VITTARIA. Two species. Ferns. Stove herbaceous perennials. Division or seeds. Loam and peat.

VOANDZEIA subterranea. Stove creeping annual. Seeds. Rich mould.

VOLKAMERIA aculeata. A stove evergreen shrub, and *V. japonica*, a green-house evergreen tree. Cuttings. Sandy loam and peat.

VOUAPA bifolia. Stove evergreen shrub. Ripe cuttings. Sandy loam and peat.

VOYRA rosea. Stove herbaceous perennial. Seeds. Sandy loam and peat.

VRESIA psittacina. Stove epiphyte. Suckers. Leaf-mould and potsherds.

WACHENDORFIA. Eight species. Green-house bulbous perennials. Offsets or seeds. Sandy loam and peat.

WAHLENBERGIA. Four species. All hardy; *W. grandiflora*, an herbaceous perennial; *W. repens*, an evergreen creeper; the other two are annuals. Division and seeds. Loam and peat.

WALDSTEINIA *geoides*. Hardy herbaceous perennial. Division or seeds. Common soil.

WALKERA. Two species. Stove evergreen shrubs. Ripe cuttings. Sandy loam and peat.

WALKS. See *Gravel*. It may be observed here, that of whatever material a walk is composed, that it is essential to have it well under-drained, and for this purpose an understratum of flints or brick-bats, twelve inches deep, is not too much. Walks so founded, are never wet or soft. Coal ashes, or which is still better, fresh tan, makes a pleasant winter walk, particularly on tenacious soils, as it never adheres to the shoes, either during rain or after frost; half an inch I think is sufficient. It likewise makes a soft and pleasant summer walk, and from its loose nature, is readily cleared from weeds. If not wanted during summer, it may readily be swept clean off after a few dry days. It is invaluable for covering walks or footpaths in the kitchen garden, when there is much wheeling of manure or soil, to be done during frost, which is too often obliged to be suspended after ten or eleven o'clock, when there is clear sunshine, from the ground getting soft and clammy. With a covering of tan, the operation may be continued throughout the day, and even during wet weather. If the tan remain permanently, it will require renewing every two years.—*Gard. Chron.*

WALL CRESS. *Arabis*.

WALL-FLOWER or **STOCK-GIL-FLLOWER**. *Cheiranthus*.

C. arboreus. Shrubby W. F. Yellow. June.

C. cheiri. Common W. F. Yellow, crimson, brown. June.

C. firmus. Permanent W. F. Yellow. July.

C. linifolius. Flax-leaved W. F. Purple. July.

C. scoparius. White, yellow, and purple. June.

C. semperflorens. Everblooming W. F. White. July.

Besides these species and varieties, there are many *German Wall-flowers* imported, mostly semi-double, and well worthy of culture for their peculiar colours and habits.

Sowing is best done in June, the seedlings to be transplanted into nursery beds when three inches high. They

will bloom in the spring, and the best may be then selected. Watering in very dry weather, lengthens the duration of their bloom. Saltpetre one ounce to the gallon, given once in ten days, heightens their colour and vigour.

Cuttings.—The double varieties are thus propagated. When the old plants are done blooming, cut off their heads; water them freely, and they will produce shoots along with their entire stem; these when from four to six inches long, must be cut off close to the stem, and be planted in a light rich shady border, under a hand-glass; watering occasionally until rooted.

Soil.—A light rich loam, mixed with a little lime rubbish, suits it best. See *Stock*.

WALLICHIA. Two species. Stove palms. Seeds. Strong rich soil and a strong heat.

WALLS are usually built in panels, from fifteen to thirty feet in length, one brick thick, with pillars for the sake of adding to their strength, at these specified distances; the foundation a brick and a half thick. The plan of Mr. Silverlock, of Chichester, is worthy of adoption, since if well constructed, it is equally durable, and saves one-third of the expense. Walls so constructed are stated to become dry after rain, much more rapidly than a solid wall of the same or any other thickness, and there appears not a shadow of a reason why it should not ripen fruit equally well.

He forms the wall hollow, nine inches in breadth, by placing the bricks edge-wise so as to form two facings, they are laid in good mortar, and the joints carefully finished. They are placed alternately with their faces and ends to the outsides, so that every second brick is a tie, and in each succeeding course, a brick with its end outwards is placed on the centre of one laid lengthwise on either side. The top of the wall must be covered with a coping of stone or bricks, projecting two inches. It is strengthened at every twenty feet, by piers of fourteen inch-work, built in the same manner, with bricks laid on edge. The mode of constructing the piers, obviating the disadvantages arising from training branches round their sharp angles, which often causes them to gum, recommended by the Rev. T. Cul-lum, of Bury St. Edmonds, is to have their corners bevelled. He also advises

the copings to project much further than they are usually made to do, even as much as twelve inches; but his reasoning refers more immediately to the management of wall fruit.

It is a practice sanctioned by economy, to build the wall half brick thick, on a nine inch foundation, and to compensate for its want of strength, a waved form is given. Both the smallness of its substance and its form, are found, however, to be inimical to the ripening of fruit.

In every instance a wall should never be lower than eight feet. The thickness usually varies with the height of the wall, being nine inches, if it is not higher than eight feet; thirteen and a half inches, if above eight and under fourteen feet; and eighteen inches, from fourteen up to twenty feet.

Fruit trees will succeed quite as well against a stone wall as against a brick one, although the former is neither so neat in appearance, nor can the trees be trained in such a regular form upon it as upon the latter. The last disadvantage may be in a great measure remedied by having a wooden or wire trellis affixed to it.—*Gard. Chron.*

If it be desirable that the roots of the trees should benefit by the pasturage outside the wall, it is very common to build it upon an arched foundation.

Colour has very considerable influence over a body's power of absorbing heat. If a thermometer on a hot summer's day, be exposed to the sun, it will indicate a temperature of about 100°; but if the bulb be blackened with Indian ink or the smoke of a candle, it will rise from ten to twenty degrees higher. The reason for this is that the polished surface of the glass reflects some of the sun's rays, but the blackened surface absorbs them all. Blue absorbs all but the blue rays—red all but the red—green and yellow all but those of their own name—and white reflects all the rays. The lightest coloured rays are the most heating, therefore light coloured walls, but especially white, are the worst for fruit trees. The thermometer against a wall rendered black by coal tar, rises 5° higher in the sunshine, than the same instrument suspended against a red brick structure of the same thickness; nor will it cool lower at night, though its radiating power is increased by the increased

darkness of its colour, if a proper screen be then employed.—*Johnson's Princ. of Gard.*

Inclined or Sloping Walls have been recommended, but have always failed in practice. It is quite true that they receive the sun's rays at a favourable angle, but they retain wet, and become so much colder by radiation at night than perpendicular walls, that they are found to be unfavourable to the ripening of fruit.

"*The Flued-wall or Hot-wall*," says Mr. Loudon, "is generally built entirely of brick, though where stone is abundant and more economical, the back or north side may be of that material. A flued wall may be termed a hollow wall, in which the vacuity is thrown into compartments, to facilitate the circulation of smoke and heat, from the base or surface of the ground, to within one or two feet of the coping. Such walls are generally arranged with hooks inserted under the coping, to admit of fastening some description of protecting covers, and sometimes for temporary glass frames. A length of forty feet, and from ten to fifteen high, may be heated by one fire, the furnace of which, being placed one or two feet below the surface of the ground, the first course or flue will commence one foot above it, and be two feet six inches, or three feet high, and the second, third, and fourth courses, narrower as they ascend. The thickness of that side of the flue, next the south or preferable side, should for the first course, be four inches or brick and bed, and for the other courses, it were desirable to have bricks cast in a smaller mould: say for the second course three, for the third two and three quarters, and for the fourth two and a half inches in breadth. This will give an opportunity of beveling the wall, and the bricks being all of the same thickness, though of different widths, the external appearance will be everywhere the same."—*Enc. Gard.*

Mr. Paxton has the following excellent observations upon *Conservative Walls*, or walls so constructed as to shelter trees trained against them from winds, and other natural modes of rapidly lowering the temperature:—

"In forming a conservative wall, it is necessary that it should have a south or a south-western aspect. It is also desirable, in order to give it an ornamental

appearance, that there should be prominent parts at certain intervals, or that the whole should be divided into recesses and projections. The latter, by being of limited dimensions, would serve for the display of the more hardy plant, and also afford additional shelter to the remaining portions. If, moreover, the whole be surmounted by an appropriate coping, its beauty will be greatly enhanced.

"Much has been said of the conservative wall at Chatsworth, the leading characteristics of which are a practical illustration of the opinions now advanced—large retiring compartments, covered with a neat trellis, and relieved by occasional small stone projections or piers; and as the wall stands on a steep slope, each of the piers is raised considerably higher than the one below it, thus constituting as it were a series of very broad ascending steps on the top.

"The advantage of having a slight wooden trellis against the wall, instead of fastening the plants to it in the usual way, need scarcely be pointed out. Independently of its superior appearance, which is a point too frequently neglected in such matters, the greater ease with which the branches can be attached to it, and removed or altered at any time, is quite sufficient to give it the preference, while the destruction and defacement of the wall consequent on the use of nails, and the injury they often occasion to the shoots of the plants, give a value to any system by which they can be discarded. The extra expense of the trellis is too trifling to be regarded.

"It has been found, in attempting to grow exotics against open walls, that whatever tends to preserve the border in which they are planted comparatively dry, during the winter, does more towards sheltering them from the frost than extensive protection of any other kind.

"As the fluids of plants are, for the most part, imbibed through the roots, and as the heat of vegetable bodies escapes mainly in proportion to the fluids they contain, protection to the medium in which they grow is perhaps even more necessary than to the stems and branches. It will therefore be seen, that the portion of the border where the roots lie must be covered, and that, if the canvas or other protection actually

given to the wall does not extend over the border, a coating of dry litter should be spread over it, as soon as severe weather commences, and be retained on it until the spring.

"The wall is composed of alternate prominent and retiring compartments. Each of the former includes two stone pillars, which stand out a little beyond all the remainder, and are to be left uncovered; while, between these, is a division, over which is extended a trellis for supporting the hardiest sorts of climbers and those that demand no protection.

"The recesses are capable of being covered in cold weather with glazed sashes, which can be placed out of sight in a moment, whenever it is safe to remove them, by sliding them behind the other divisions. In these recesses the tenderest green-house plants may be cultivated, and trained against a trellis.

"Thus are combined a handsome architectural elevation, and the means of having some of the finest exotic plants exposed in summer, without danger, and in a condition incomparably more healthy and attractive than they ever attain in the green-house.

"If glazed sashes are too expensive, canvas, or other screens, can be readily substituted; but, in that case, the plants will suffer from being kept in darkness during the winter. Where it is thought preferable, another set of rails, on the outside of those for the sashes, can be prepared, to carry some kind of covering in rigorous weather. Where this is done, the necessity for fire heat will be trifling; in fact it might be entirely dispensed with."—*Paxton's Magazine of Botany*.

PLANTS FOR A CONSERVATIVE WALL.

Abutilon striatum; *Acacia angustifolia*, *armata*, *cultiformis*, *dealbata*, *decurrens*, *juniperina*, *lancelota*, *longissima*, *lunata*, and *mucronata*.
Bignonia capreolata, *grandiflora*, and *tweediana*; *Billardiera longiflora*; *Bossia linophylla* and *scelopendrium*; *Brachyema hybridum* and *undulatum*; *Brugmansia sanguinea* and *suaveolens*; *Budleya Lindleyana*.
Camellia Japonica; *Ceanothus azureus*; *Ceratonia siliqua*; *Clematis azurea grandiflora*, and *sieboldi*; *Correa bicolor*, *Harrisii*, *Lindleyana*, and *pulchella*.

Diplacus pumiceus.

Edwardsia grandiflora and *microphylla*;
Erythrina crista-galli; *Eutaxia myrti-*
folia.

Grevillea rosmarinifolia.

Hibbertia volubilis.

Jasminum grandiflorum, and *umbellat-*
tum.

Kennedya lilacina, *longiracemosa*, and
ovata.

Lagerstræmia indica; *Linum trigynium.*

Malva creæana; *Manettia bicolor*; *Ma-*
rianthus cæruleo-punctatus; *Mimosa*
prostrata.

Olea fragrans.

Passiflora alata, *cærulea*, *cærulea race-*
mosa, and *mayani*; *Plumbago capen-*
sis; *Polygala cordifolia* and *grandi-*
flora; *Punica granatum.*

Rhodochiton volubile.

Schinus molle; *Siphocampylus bico-*
lor; *Sollya heterophylla* and *liniaris*;
Swainsonia coronillæfolia.

Tacsonia mollissima and *pinnatistipula.*
WALNUT, ENGLISH. *Juglans regia.*

Varieties.—Common Duck Nut; Ha-
tif; Highflyer; Double; Tardif; York-
shire. Of these Highflyer and Yorkshire
are best.—*London Hort. Soc. Catalogue.*

Propagation by Seed.—Sow in drills
twelve inches apart and two inches and
a half deep, and the nuts six inches
apart. This may be done in October,
or the nuts preserved in dry sand until
February. They will come up the same
spring, and, by the end of summer, the
young plants will be half a foot or more
high, which, after having two years'
growth in the seed-bed, plant out in the
nursery. Previously, when taken up,
shorten their tap roots; but preserve
their tops entire, and plant them in
rows two feet and a half asunder, and
about eighteen inches distant in each
row. Here they are to remain a few
years, training them with single stems,
till five or six feet high, then transplant
them where they are to remain.

Those intended principally as timber
trees, as well as to bear fruit, should be
always planted out for good when from
four to five feet high; or, if the nuts
were planted at once where the trees
are designed to remain, without trans-
planting, they would assume a quicker
and stronger growth.

By Grafting.—Mr. Knight first suc-
ceeded in this operation, and the fol-
lowing directions accord with his
mode:—

“The shoot to be grafted must be
cut above the place where a young
shoot is pushing; this shoot must be
preserved, and the scion must be placed
opposite to it, being fitted in the man-
ner of whip-grafting, care being taken
that the inner barks coincide. When
the bnds of the scion begin to swell, the
point of the shoot left opposite on the
stock must be pinched; and when the
graft has fully burst into leaf, and is
consequently in a condition to appro-
priate the whole of the sap, the shoot
on the stock may be then dispensed
with.

“The scions should be taken off in
March, and their ends laid in the ground
till required for use, as above men-
tioned.”—*Gard. Chron.*

Soil.—It prefers a deep loam, though
it will succeed on all light moderately
fertile soils, provided they are well
drained.

Planting.—Walnut trees should
never be planted nearer to each other
than sixty feet. They require no
pruning.

Preserving the Fruit.—It is ripe in
October, and should be allowed to hang
upon the tree until the outer covering
begins to crack. In this state, when
the tree is shaken, many of the walnuts
as they fall will roll out of the husk.
These should be gathered into a basket,
separate from those that retain their
covering; the latter should be laid aside
for a few days, until the husks burst,
and they can be taken out with ease.
The great object is to prevent them
from becoming mouldy; they should,
therefore, be wiped clean and dry, and
laid on a shelf, in a dry place, where
they can have a free current of air, until
all tendency to mouldiness is overcome.
Great care must, however, be taken that
they are not over dried, for that will
cause shriveling. When sufficiently
dry they should be put into boxes in
layers, alternately with bran, fine dry
sand, or shreds of cloth, and kept for
use in a cool dry situation. By this
means they will retain their moisture
and flavour, and the film will with ease
peel off.—*Gard. Chron.*

Taking the Fruit.—There is an un-
gallant distich which says—

“A woman, spaniel, and walnut tree,
The better are, the more well thrash'd they
be.”

But in the third instance most certainly

it is "a vulgar error." Walnuts should be literally gathered or shaken from the tree, for none other bleeds more freely if wounded; and no result of practice or suggestion of science can point out why the walnut tree, contrary to all others, is benefited by having its branches bruised and broken.

WALNUT, BLACK. *Juglans nigra*.

WARDIAN CASE. See *Glass Case*.

WARREA *cyanea*. Stove.

WARTWORT. *Euphorbia helioscopia*.

WASPS should be sedulously destroyed during April, May, and June, for all appearing in these months are queens, and the foundresses of nests. Their favourite resort at that season is the laurel, for the sake of the honey secreted by the midribs of its leaves. They may then be caught in the hooped gauze net of the entomologist. In August, wasps' nests should be destroyed, and spirit of turpentine is the best agent that can be employed for the purpose. The mode of using it when the nest is in the earth has been thus detailed. Put some of the turpentine into a large bottle, shaking it about until the whole of the inside is wetted by it; then fix the neck of the bottle in the nest's entrance, and place over it a large flower-pot. By replenishing the bottle with turpentine once or twice, the whole of the wasps will be destroyed by the fumes.—*Gard. Chron.*

If the nest be in a place where the bottle cannot be employed, the spirit may be injected by a syringe, and the fume retained by covering up the nest's mouth.

WATER being an essential application to the seed, as well as to the growing plant, the source from whence it comes is by no means immaterial. The best for the gardener's purpose is rain water, preserved in tanks sunk in the earth, and rendered tight either by puddling or bricks covered with Parker's cement. To keep these tanks replenished, gutters should run round the eaves of every structure in the garden, and communicate with them. Every hundred cubic inches of rain water, contains more than four cubic inches of air, of which more than half are carbonic acid gas, and the remainder nitrogen and oxygen in the proportion of sixty-two of the former to thirty-eight of the last named.

Liebig, from actual experiment on a large scale, states that both rain and snow contain ammonia; and its importance appears from the fact that if there be only one-fourth of a grain in each pint of water, the annual deposition from the atmosphere would be more than sufficient, on half an acre of ground, to give all the nitrogen contained in the vegetable albumen of 150 cwt. of beet root. Rain water also contains a peculiar substance, analogous to the extractive matter and gluten of plants, though differing from them chemically. To this substance, Dr. Daubeney has given the name of pyrrhine. Traces of salts and oxides have also been found in rain water, but, compared with all other naturally produced, it is so pure, and so abounds with the gases beneficial to plants, that none other can equal it for their service.

That obtained from ponds or springs, invariably contains matters offensive or deleterious to plants. That known as hard water, containing an excess of salts of lime or magnesia, is invariably prejudicial, and pond water is scarcely less so. If it be stagnant, and loaded with vegetable extract, it is even worse than hard spring water; for it then contains carburetted hydrogen and other matters noxious to vegetables. These last named waters, if obliged to be employed to tender plants, should have a pint of the ammoniacal water of the gas works, mixed thoroughly with every sixty gallons, an hour or two before they are used.

Mr. Paxton justly observes that "watering outdoor crops is frequently recommended during continued dry weather; but it should be avoided as long as possible, as the benefit of artificial watering is but temporary, and it has the effect of exciting the roots, thereby rendering them more liable to suffer when the water has evaporated. When, in a case of emergency, it becomes necessary to water, it should be given morning and evening, more abundantly than is usually done, and never discontinued after its commencement, until a change in the weather renders it no longer necessary. Discrimination should be used in selecting proper objects for watering; for it is no uncommon occurrence to see small basins of soil formed round the stems of fruit trees, on walls and other per-

manent plants, into which several pans of water are poured daily during drought. This must be useless or nearly so, as the roots which would take up the water, for the benefit of the plants, will form a circle at a considerable distance from the stem. Seed beds, or plants which can be regularly and thoroughly watered, as radishes, lettuce, and salading, will be much benefited, but artificial watering out of doors, in the manner it is usually applied, is of little service; and in the case of strawberries, and similar crops, mulching with straw, grass, or some such contrivance, which will prevent the rapid evaporation of moisture from the soil, is much preferable."—*Gard. Chron.*

Mr. S. Taylor, of Stoke Ferry, in the *Gardeners' Magazine* for 1840, recommends the use of bottles with two small holes in the sides near the bottom, for watering plants. The bottles are buried to the neck, near the roots of the flower which requires watering, and after being filled and corked, the water is allowed gradually to exude through the holes. "This," says that good horticulturist, Mr. W. P. Ayres, "though undoubtedly an ingenious method, is objectionable, because the roots of the plants are liable to be injured in plunging the bottles, and that it would require so many of them, where copious watering was necessary. A better plan is to take moderate sized flower-pots, and having placed an inch or two of rough gravel in the bottom of each, to place them round the plant to be watered, and fill with water, which as it percolates gradually through the gravel, will soak into the ground. For plants such as standard roses, rhododendrons, &c., closely turfed over on lawns, or for any thing in a sloping situation, this is a most excellent plan, as the pots filled with water may be placed at night, and removed the next morning, so as not to become an eyesore. Watering plants in flower beds is at all times a difficult matter, because if the borders are sufficiently full of soil to give them a convex form, which they always ought to have, the water runs to the sides of the borders as fast as it is poured on. In such cases it will be found advisable to perforate the beds as thickly as possible, without injuring the roots, to the depth of six or eight inches, with a stick one inch in diameter, and by filling these

ten or a dozen times, the ground will become thoroughly soaked. With annuals, verbenas, and other grouping plants, I have found this a most excellent method. In connection with the watering of strawberries, a radical improvement is required; for although gardeners are pretty liberal with the limpid fluids over the heads of the plants, they are not good conservators of the quality of the fruit. It is true, by copious watering, both the size and quantity of the fruit is much increased; but it is equally true that if water is used over the plants after the fruit is half grown, the latter will be much deteriorated in quality. We all know that strawberries in a wet season are never so high flavoured as they are in a dry one, and what is the reason? Why, because there is a superabundance of aqueous matter in the fruit; and so it is with the plants copiously watered overhead in dry seasons. In truth, it may be laid down as a rule, if fine flavoured fruit be a desideratum, water ought never to come in contact with it after the saccharine or maturing assimilation commences. Hence in watering strawberries, let it be poured from the spout of the watering pot upon the soil, but on no account is it to touch the fruit; or, what will be better, fork the ground over between the plants, give it a good soaking, to at least the depth of a foot, and cover it two or three inches deep with clean straw. This will both prevent the evaporation of moisture, and the radiation of terrestrial heat; and as the straw, from its colour and non-conducting qualities, will reflect instead of absorbing the heat, the fruit, being subjected to increased temperature, will, in consequence, be improved in flavour. If water is required after the straw is placed on the beds, let it be applied through pots, placed one foot apart, as recommended above for plants on a lawn."—*Gard. Chron.*

I agree with those who recommend "sunrise as the best time for the watering of exposed plants. Evaporation no doubt will then go on freely; but the atmosphere is beginning to get warmer, and the sun's rays to exert their counteracting influence. The darkened surface—that very condition which made the soil throw off its heat more readily during the night, causes it to imbibe the heat of the sun's rays by day with in-

creased facility, so that you thus have the greatest amount of the fostering agencies of heat and moisture for the growth of plants. When evening again comes round, the surface moisture has been dried up, and its colour again rendered of a lighter shade; there is consequently little diminution of temperature beyond surrounding objects, either from evaporation or radiation of heat.” —*Gard. Chron.*

Although an excess of water applied to the roots of plants is injurious to them, yet all of them are benefited by a due supply of that liquid, and the supply has to be regulated by the amount of their daily transpiration. The gardener knows that this differs in every species, and during different seasons. For instance, in a dry hot day, a sunflower three feet and a half high transpired 11lb. 4 oz., being seventeen times more than the human body; during a hot dry night, 3 oz.; during a dewy night there was no transpiration, and during a rainy night the plant absorbed 3 oz. Therefore, the gardener finds it best to apply water during dry weather early in the morning, just before the chief demand occurs, which is from six A.M., till two in the afternoon; and during moist weather he refrains from the application entirely. Then again the gardener keeps his agaves and other fleshy-leaved plants in a dry stove, for they transpire but sparingly in proportion to their mass, and require watering but seldom, and then abundantly; for they take up, as in their native silicious habitats, a large supply, and retain it pertinaciously in defiance of the long-protracted droughts to which they are exposed. In the same species I have always found varieties transpire abundantly and require a large supply of water in proportion to the extent of their transpiring surface. Thus the broad-leaved fuchsias and pelargoniums transpire from two to three times as much as those varieties which have smaller and less abundant foliage. Excessive moisture induces that over succulency, which is ever attended by weakness, unnatural growth, and early decay. Such plants more than any others are sufferers by sudden vicissitudes in the hygrometric state of the atmosphere, and are still more fatally visited, if exposed to low reductions of temperature.” —*Princ. of Gard.*

WATER CRESS. *Nasturtium officinale.*

Varieties. — Small brown-leaved, hardiest; Large brown-leaved, best for deep water; Green-leaved, easiest cultivated. — *London Hort. Soc. Trans.*

Planting in Water. — On this we have the following good directions in the *Bon Jardinier*. The depth of the trenches in which they are grown being entirely dependent upon that of the springs by which they are supplied with water, the former are so prepared that, as nearly as possible, a regular depth of three or four inches can be kept up. These trenches are three yards broad, and eighty-seven yards long, and whenever one is to be planted, the bottom is made quite firm and slightly sloping, so that the water which flows in at one end may run out at the other. If the bottom of the trench is not sufficiently moist, a small body of water is allowed to enter to soften it. The cresses are then taken and divided into small sets or cuttings, with roots attached to them; and these are thrown over the bottom of the trench at the distance of three or four inches from each other. The cress soon attaches itself to the damp earth; in three or four days the shoots straighten and begin to strike root. At the end of five or six days, a slight dressing of well decomposed cow-dung is spread over all the plants, and this is pressed down by means of a heavy board, to which a long handle is obliquely fixed. The water is then raised to the depth of two or three inches, and never higher. Each trench is thus replanted annually, and furnishes twelve crops during the season. In the summer the cresses are gathered every fifteen or twenty days, but less frequently during winter: care is taken that at each gathering at least a third part of the bed is left untouched, so that neither the roots may be exhausted, nor the succeeding gathering delayed. After every cutting, a little decayed cow-dung, in the proportion of two large barrowfuls to each trench, is spread over the naked plants, and this is beaten down by means of the rammer above mentioned. After the water cresses have been thus treated for a twelvemonth, the manure forms a tolerably thick layer at the bottom of the trench, and tends to raise its level. To restore it to its original level, all

the refuse should be thrown out upon the borders which separate the trenches from each other. These borders may be planted with artichokes, cabbages, or cauliflowers, which will here attain a great size. Cress-grounds should always be at a distance from trees, on account of the leaves, which otherwise drive amongst the plants, and require much time to pick out. There are two weeds which, even in the cleanest cress-grounds, can scarcely be kept under; these are the Duckweed and *Zannichellia palustris*, which both multiply so quickly, that unless carefully rooted out, they do great injury to the cresses. The *Zannichellia* may be kept under by careful hand-weeding, and the Duckweed by raising the water, so as to make it float above the cress plants, when it may be skimmed off.

Planting in Borders.—This must be done in September and in a moist shady border. Plant slips, and the only cultivation necessary is to dig the earth fine, to draw a slight trench with a hoe, to fill this with water until it becomes a mud, to cover it about an inch deep with drift sand, and then to stick in the slips about six inches apart, watering them until established. The sand keeps the plants clean. They will be ready for gathering from in a very few weeks, and the shoots should be invariably cut and not picked. They are not so mild flavoured as those grown in water, but then they are free from aquatic insects, &c.

WATERFALL. See *Cascade*.

WATER GERMANDER. *Teucrium Scordium*.

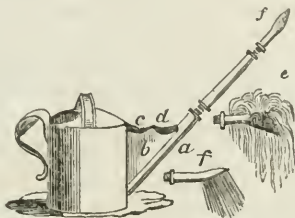
WATERING ENGINE. See *Engine*.

WATERING POTS. These should have roses pierced with very fine holes; the diameter of those usually used is too large. *Long-spouted* watering pots are required for watering plants in pots upon shelves. *French* watering pots have zigzag bends in the spout to break from the plant the force of the water. *Shelf* watering pots are small and flat-bodied for giving water to plants overhead, and near the glass in green-houses or stoves.

"The accompanying engraving is of a watering pot from Mr. G. Thompson, 390 Oxford Street, who states that its superiority consists in the roses being

so formed as to give the water thrown from them the nearest resemblance to a gentle shower of rain, which renders it peculiarly suitable for watering seedlings or other tender plants. As the brass joints which connect the roses to the spout are made water-tight, there is no danger of its returning outside, to

Fig. 176.

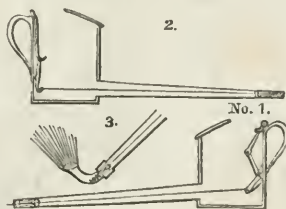


the annoyance of the person using it: *a* is the spout to which the roses are screwed; *b*, the box to contain either spout out of use; *c* and *d*, the holes in which the joints are placed; *e*, a large rose for watering flower beds; *f*, a smaller rose for watering plants in pots."—*Gard. Chron.*

Another watering pot is the following, and suggested by Mr. Williamson.

"No. 1 represents the original, which differs from a common watering pot in having its tube inserted in a horizontal position, with a brass valve near the point, through which passes a brass wire or rod, held in its proper position by two strong transverse pieces of wire, perforated in the centre, and

Fig. 177.

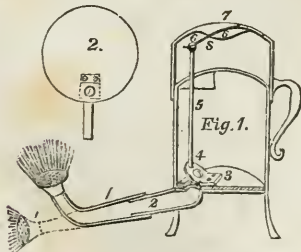


connected with a crank or lever, between the lower part of which and the side of the pot is a steel spring, which propels the piston and shuts the valve. From the top of the lever is

fixed a brass rod, which is kept in its place by a collar brazed to the side of the pot. In raising, the rod is pressed by the finger. No. 2 represents the improvements, which consist in a double lever, acting like the key of a flute. Instead of the steel spring at the end of the lever, a spiral one of brass wire is fixed within the point of the tube, immediately before the valve, which it shuts; at the other end of the tube is a convex rose of copper, to prevent dirt, &c., passing into the tube, through the centre of which passes the rod in connexion with the lever and the valve. No. 3 differs from the preceding only in having a movable curved tube attached to the pipe, at the top of which is a very fine rose about an inch in diameter. From the length of tube (about twenty inches) the pressure of water is considerable, when the pot is held in an inclined position, producing a light shower admirably suited to small seeds."—*Gard. Chron.*

A third invention is Mr. Saul's, and, he says, "it can be constructed at a very little more expense than those in general use. In the annexed sketch, Fig. 1 represents a section of the can; 1 1 are removeable tubes, having roses on their upper ends, while the lower ends slide over the tube 2, fixed into the can; 3 is a valve placed over this tube, made of strong leather, and having a small block of wood on the top like those in common pumps, the bottom of the can being wood, the valve is screwed on it, as shown at 4, in such a

Fig. 178.



manner as to be easily taken off, when it requires to be repaired. The rod 5 is connected with the valve 3, and the spring 6; when used, the can may be held by the handle, either in the right

hand or the left: by drawing up the spring 6 with the forefinger, the valve is raised by means of the connecting rod 5, and consequently the water flows into the tubes 1 and 2; as soon as the finger is removed from the spring, the valve falls, and the water is stopped. The spring is fixed on the under side of the handle, and nearly all inclosed in that part made to fit the hand. Fig 2 represents the bottom of the can; the dotted line showing the size of the valve; 1 shows the point at which the water flows into the tubes."—*Gard. Chron.*

WATER LEMON. *Passiflora laurifolia.*

WATER LILY. *Nymphaea.*

WATER MELON. *Cucumis Citrullus*, var.

WATER PLANTS. See *Aquarium.*

WATER PURSLANE. *Peplis.*

WATER VINE. *Tetracera potato-ria.*

WATER VIOLET. *Hottonia.*

WATSONIA. Fifteen species. Green-house bulbous perennials. Offsets or seeds. Sandy loam and peat.

WAYFARING TREE. *Viburnum Lantana.*

WEATHER. The gardener, even more than the farmer, is dependent upon the weather for opportunity to insert and to remove the plants under his care. I shall, therefore, give him all the prognostics which appear worthy of attention.

1. The hollow winds begin to blow;
2. The clouds look black, the glass is low;
3. The soot falls down, the spaniels sleep,
4. And spiders from their cobwebs peep;
5. Last night the sun went pale to bed;
6. The moon in halos hid her head.
7. The boding shepherd heaves a sigh,
8. For see, a rainbow spans the sky;
9. The walls are damp, the ditches smell,
10. Closed is the pink-eyed pimpernell;
11. Hark! how the chairs and tables crack,
12. Old Betty's joints are on the rack;
13. Loud quack the ducks, the peacocks cry,
14. The distant hills are looking nigh;
15. How restless are the snorting swine,
16. The busy flies disturb the kine;
17. Low o'er the grass the swallow wings,
18. The cricket, too, how sharp he sings;
19. Puss on the hearth, with velvet paws,
- Sits wiping o'er her whisker'd jaws;
20. Through the clear stream the fishes rise,
- And nimbly catch th' incautious flies;
21. The glow-worms, numerous and bright,
- Illumed the dewy dell last night;
22. At night the squalid toad was seen
- Hopping and crawling o'er the green;
23. The whirling wind the dust obeys,
- And in the rapid eddy plays;

24. The *frog* has changed his yellow vest,
And in a russet coat is drest;
25. Though June, the air is *cold yet still*;
26. The *blackbird's* mellow voice is shrill;
27. My *dog*, so alter'd is his taste,
Quits mutton bones, on grass to feast;
28. And see yon *rooks*, how odd their flight,
They imitate the gliding kite,
And seem precipitate to fall,
As if they felt the piercing ball;
'Twill surely rain, I see, with sorrow,
Our jaunt cannot take place to-morrow.

In the foregoing rhymes, attributed to Dr. Jenner, are comprised nearly all the natural phenomena which predicate approaching rain, and most of them are sustained by our more scienced knowledge.

Thus the *wind*, when rain is approaching, causes more moaning and whistling sounds in passing through the crevices and crannies of our houses, on the same principle that all other gases, in proportion as they are more or less heated, or more or less dry, cause louder or lower sounds in passing through the orifices of small tubes.

Soot falls because it absorbs more moisture from the air as rain approaches, and becoming heavier breaks away from its slender attachment to the chimney's walls. A *halo* round the moon is caused by the rays of its light passing through moisture precipitated from the air, and the larger the halo, the nearer is such precipitated moisture to the earth, and consequently the rain is at hand.

Walls become damp from the same cause that soot falls, when rain is approaching, namely, because the moisture in the air is more abundant, and in a state of mixture with it more easily separable. Walls that thus become damp, contain chloride of calcium, or other salts which are deliquescent, that is, absorb moisture from the air. Ditches *smell* in rainy weather, because all odours are conveyed with more facility by damp than by dry air. Not only does the pimpernell (*Anagallis arvensis*) close its flowers when exposed to damp air, but those of many other plants are similarly sensitive. *Convolvulus arvensis* (field Bindweed), *Anagallis arvensis*, *Calendula pluvialis*, *Arenaria rubra* (purple Sandwort), *Stellaria media* (Chickweed or Stitchwort), and many others, are well known to shut up their flowers against the approach of rain; whence the *Anagallis* has been called "the Poor Man's Weather Glass." It

has been observed by Linnæus, adds Sir J. E. Smith, that flowers lose this fine sensibility, either after the anthers have performed their office, or when deprived of them artificially; nor do I doubt the fact. I have had reason to think that, during a long continuance of wet, the *Anagallis* is sometimes exhausted; and it is evident that very sudden thunder showers oftener take such flowers by surprise, the previous state of the atmosphere not having been such as to give them due warning.

The *cracking* of furniture is the necessary consequence of the dry woody fibre expanding when exposed to moister air. *Distant objects* appear nearer when rain is at hand, because the air is rarer at such times, and objects always appear distinct in proportion to the rarity of the gaseous medium through which they are viewed. *Swallows* fly low at such times, probably for two reasons: insects are then more busy near the earth's surface, and the rarity of the atmosphere renders flying more laborious in proportion to the height to which a bird soars. The changed habits of animals at the approach of rain, are perhaps to be accounted for by the altered state of the atmospheric pressure, and of the air's electricity causing a change of sensations which warns them by past experience that the season of discomfort or of pleasure, as their nature may be, is coming upon them.

These natural phenomena combined with a careful attention to the indications of the *Barometer*, are much less erring guides than tables founded upon the moon's changes. It is impossible, in the present imperfect state of our meteorological knowledge, to say that the moon has no influence upon the weather, but it is next to certain that other influences are much more powerful and controlling. The same moon rises and sets and changes in Hindoostan as in England, yet in that climate, its wet and hot and cold seasons, its northeast and southwest monsoons arrive with a changeless regularity and intensity that demonstrate the moon's influence there has no paramount control.

The facts established by Mr. Forster and other acute observers of the barometer, appear to be these:—1. Not the great height or depression of the mercury is so much to be regarded as

whether it continues to rise or decline. 2. If the mercury falls when the wind blows nearly from due south, rain is approaching. 3. If it falls in hot weather, there will be thunder. 4. If it rises in winter, frost is high; and if, the frost continuing, it still rises, there will be snow. 5. If it falls much during frost, a thaw will set in. 6. A change taking place *immediately* after the mercury rises or falls, rarely endures. 7. If the mercury continues to rise during wet weather, or to fall during fine weather, a permanent change will come.

I am indebted to Mr. W. H. White, one of the intelligent Secretaries of the Meteorological Society, for the following observations:—

BAROMETRIC FLUCTUATIONS.

1. The barometer in calm serene weather generally ranges pretty high, rather above thirty inches; if the fluctuations daily are very small, but still rather getting higher, a fine series of days or weeks may be expected.
2. When the barometer is below twenty-nine inches, and the clouds disperse with but little wind, it will become stationary for a day or two, till the electrical equilibrium of the air be destroyed: if it then rise, expect fair weather; if it fall, expect a storm of wind accompanied with rain or hail, according to the season.
3. When the barometer ranges between 29 and 29.60, if the clouds hang low and float before a west or southwest wind, almost every cloud will deposit its contents, especially if passing over an elevation, a wood, and sometimes a river. In all cases the hygrometer should be considered: if the air be dry and the barometer fall, wind will follow; if the air be saturated with moisture, rain or sleet, according to season.
4. When the thermometer ranges in summer between 70° and 80°, and the barometer falls rapidly and extensively, thunder will follow with hail or heavy rain.
5. In winter, when the thermometer ranges below freezing, and a low barometer begins to rise, expect snow to follow; but if the thermometer rise and the barometer fall during frosty weather, a thaw will quickly follow.
6. The barometer at all seasons of the year will fall very low and very rapidly on the approach of a storm of wind without rain; on the approach of an earthquake too, though it be four or five hundred miles off!
7. If the barometer fall with an easterly or northeast wind, rain will follow.
8. If the crown of the mercury in the tube be convex, it indicates a rising will take place; if concave, it will soon fall.

These are a few of the changes peculiar to England. The operating causes of the oscillations involve one of the most interesting inquiries belonging to meteorology. Electricity is the grand mover of the barometric column. Many other rules might be gathered from the restlessness of animals, the flights of birds, and the gambols of fishes; all indicating by their motions that there is a change taking place in the electrical condition of the atmosphere.

NATURAL APPEARANCES.

1. In winter, a red sky at sunrise indicates the speedy approach of rain.
 2. In summer, the same appearance denotes refreshing showers.
 3. Squalls of wind generally follow these appearances:—"It will be foul weather to-day, for the sky is red and lowering." *Matt. xvi. 3.*
 4. Small patches of white clouds, like flocks of sheep at rest, indicate continued fine weather.
 5. Large mountainous (or Jupiterian) clouds, called cumulo stratus, produce sudden showers in spring and autumn, and hail-storms in summer and winter.
 6. When large clouds diminish in size, fine weather will follow; if they increase, rain or snow.
 7. Rainbows denote frequent showers.
- Spiders* generally alter their webs once in twenty-four hours; and a rule has been deduced from this, whereby to foretell the coming change. If they thus alter their web between six and seven in the evening, there will be a fine night; if in the morning, a fine day; if they work during rain, expect fine weather; and the more active and busy the spider is, the finer will be the weather. If spiders' webs (gossamer) fly in the autumn, with a south wind, expect an east wind and fine weather. If garden spiders break off and destroy their

webs, and creep away, expect continued rain and showery weather.

The *Leech* also possesses the peculiar property of indicating approaching changes of the weather in a most eminent degree. In fair and frosty weather it remains motionless and rolled up in a spiral form at the bottom of the vessel; previously to rain or snow, it will creep to the top, where, should the rain be heavy, or of long continuance, it will remain for a considerable time; if trifling, it will descend. Should the rain or snow be accompanied with wind, it will dart about with great velocity, and seldom cease its evolutions until it blows hard. If a storm of thunder or lightning be approaching, it will be exceedingly agitated, and express its feelings in violent convulsive starts at the top of the glass. These animal movements are all induced, probably, by sensations in the animal occasioned by changes in the atmospheric electricity.

RAIN MAY BE EXPECTED—When the sounds of distant waterfalls, &c., are distinctly heard—When the sun rises pale and sparkling—When the sun rises amidst ruddy clouds—When the sun sets behind a dark cloud—When there is no dew after heat in summer—When there is much hoar frost in winter—When mists rest on the mountain tops—When snails and frogs beset your evening walk—When gnats bite vigorously—When animals are unusually restless.

FAIR WEATHER MAY BE EXPECTED—When none of the signs of rain just given occur—When the sun sets red and cloudless—When the moon's horns are sharp—When the stars shine brightly—When smoke rises easily—When moths and beetles appear in numbers.

Clouds.—"When it is evening, ye say, It will be fair weather, for the sky is red." (*Matt.* xvi. 2.) "And this observation of nineteen centuries past is explained by the optical fact, that dry air refracts more of the red rays of light, than when it is moist; and as dry air is not perfectly transparent, those rays are reflected in the horizon."—*Davy's Salmonia.*

Rainbow.—"When this is seen in the morning, it betokens rain; but if in the evening, fair weather; and Sir H. Davy thus explains this phenomenon:—"The bow can be seen only when the clouds

depositing the rain are opposite to the sun,—thus in the morning the bow is in the west, and in the evening it is in the east; and, as the rains in this country are usually brought by westerly winds, a bow in that quarter indicates that the rain is coming towards the spectator; whereas a bow in the east indicates that rain is passing away."—*Salmonia.*

Wind.—Mr. Christensen says, that the wind changing to any point of the compass between E.S.E. and N.N.W. causes the mercury to rise; and a change to any point between W. and S. causes it to be depressed.

WEEDS should be warred upon unremittingly by the gardener, for not only does their presence detract from that neatness which should be the all-pervading characteristic of the garden, but every weed robs the soil of a portion of the nutriment which should be devoted to the crops.

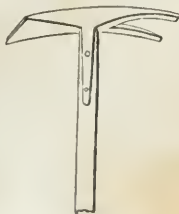
To destroy them, the hoes and weeding irons should be unremittingly at work. Neither should weeds be allowed to remain where cut down, but should be gathered together, and mixed with saline matters, to convert them into most valuable fertilizers. Never burn them. No weed will endure being continually cut down, and when cut down, it should be carried to a common heap, and a peck of common salt, and a gallon of gas ammoniacal liquor, mixed with every barrow load. The whole speedily becomes a saponaceous mass; all seeds in it are destroyed; and it is rendered one of the best fertilizers the gardener can command.

WEEDING TOOLS. See *Hoe.* Be-

Fig. 179.



Fig. 180.



sides spuds, weeding pincers, and hoes, there are several implements invented for eradicating the deeper-rooting weeds. Such are Hall's Land Crab (Fig. 179), Dockspuds and the Guernsey Weeding Prong (Fig. 180).

W E E V I L. See *Anthonomus* and *Otioryncus*.

WEIGHTS.

AVOIRDUPOIS WEIGHT.

16 Drachms,	1 ounce.
16 Ounces,	1 pound.
28 Pounds,	1 quarter.
4 Quarters,	1 cwt.
20 Cwt.,	1 ton.

WEIGHTS AS IN ENGLAND.

14 Pounds,	1 stone.
8 Pounds,	1 stone butchers' meat.
56 Pounds,	1 truss of hay.
36 Pounds,	1 truss of straw.
36 Trusses,	1 load.

WELCH ONION. See *Ciboule*.

WENDLANDIA *paniculata*. A Stove evergreen tree; and *W. populifolia*, a green-house evergreen twiner. Cuttings. Loam, peat and sand.

WESTRINGIA. Ten species. Green-house evergreen shrubs. Young cuttings. Light rich soil.

WHEELBARROWS. The greater the diameter of the wheel of a barrow, and the smaller the axis or spindle on which it turns, the less power will be required to drive it forward; for the friction is proportionately reduced.

The diameter of the wheel might be increased with manifest advantage to double that now employed, for even then it would be below the point of draught or impulsion (the hand of the labourer); and the nearer it can be brought to a level with this, the more efficiently he exerts his power.

The breadth of the wheel's periphery, or felloes, might be also increased two inches advantageously; for, as it is always employed upon a surface in some degrees soft, such an increased breadth would decrease the depth to which the wheel of a loaded barrow usually sinks into the soil, and would proportionately decrease the power required to overcome the augmented opposition. In a wheelbarrow so constructed, a man might move with more ease eight hundred weight, than he now impels five hundred weight, which is a full barrow load.

If a wheelbarrow be made of wood, the feet and handles should be capped with iron, and its joints strengthened with bands of the same metal. Iron barrows are now made weighing no more than ninety-two pounds, and they run very light.

The longer the handles of a wheelbarrow are, and the nearer the load to the wheel, the easier is that load lifted, and the easier is the barrow turned over to discharge the load.

WHIRLING PLANT. *Desmodium gyrans*.

WHITE BEAN TREE. *Pyrus Aria*.

WHITE CEDAR. *Cupressus thyoides*.

WHITE SPRUCE. *Pinus Alba*.

WHITE TREE. *Melaleuca Leucadendron*.

WHITE VINE. *Clematis vitalba*.

WHITEFIELDIA *lateritia*. Stove evergreen shrub. Cuttings. Leafy mould and loam.

WHORTLE BERRY. *Vaccinium*.

WIDOW WAIL. *Cneorum*.

WIGANDIA *caracasana*. Stove deciduous shrub. Seeds. Loam and peat.

WILDERNESS. See *Labyrinth*.

WILD LIQUORICE. *Abrus*.

WILD SERVICE. *Pyrus torminalis*.

WILD ENOVIA. Two species. Grasses. Division. Loam and peat.

WILLEMETIA *africana*. Stove evergreen shrub. Young cuttings. Sandy loam and peat.

WILLOW. *Salix*.

WILLUGHBEIA *edulis*. Stove evergreen shrub. Cuttings. Loam, peat, and sand.

WIND FLOWER. *Gentiana Pneumonanthe*, and *Anemone*.

WINGED PEA. *Tetragonolobus purpureus*.

WINTER ACONITE. *Eranthis*.

WINTER BERRY. *Prinos*.

WINTER CHERRY. *Physalis*, and *Cardiospermum Halicacabum*.

WINTER CRESS. *Barbarea*.

WINTER MOTH. See *Cheimatobia*.

WINTER SWEET. *Origanum heracleoticum*.

WIRE-WORMS are the larvæ of various species of *Elater*, *Click Beetle*, or *Skip Jack*. Of these there are more than fifty species; but the most common are:—

E. segetis, of which the wire-worm is often so abundant in old pastures, and

of which the ravages are so great occasionally upon our corn crops.

E. sputator. Spring beetle. The larva or wire-worm of this is particularly destructive to the lettuce and carrot.

The following general description of the click beetles and their larvæ, is given by Mr. Cuthbert Johnson, in the *Farmers' Encyclopædia* :—

"Click beetles are readily known by having the sternum produced behind in a strong spine fitted to enter a groove in the abdomen, situated between the intermediate pair of legs. By bringing these parts suddenly into contact, the insects are enabled to spring to some height into the air, and thus recover their natural position when they happen to fall on their backs, which they frequently do when dropping from plants to the ground. A special provision of this kind is rendered necessary in consequence of the shortness and weakness of their legs.

"The wire-worms have a long, slender, and cylindrical body, covered by a hard crust, which has obtained for them the above name. They are composed of twelve segments, fitting closely to each other; and are provided with six conical scaly feet, placed in pairs on the three segments next the head. The latter is furnished with short antennæ palpi, and two strong mandibles or jaws.

"To remove the wire-worm from a soil, no mode is known but frequently digging it and picking them out, as their yellow colour renders them easily detected. To prevent their attack upon a crop, mix a little spirit of tar, or a larger quantity of gas lime, with the soil. It has been stated that growing white mustard drives them away, and it is certainly worth the trial. To entrap them, and tempt them away from a crop they have attacked, bury potatoes in the soil near the crop; and if each potato has a stick thrust through it, this serves as a handle by which it may be taken up, and the wire worms which have penetrated it be destroyed. To decoy them from beds of anemones, ranunculus, &c., it is said to be a successful plan to grow round the beds an edging of daisies, for the roots of which they have a decided preference.

"If a crop is attacked, as the pansy or carnation, our only resource is to bury in the soil other vegetable matters,

of which they are fonder than they are of the roots of those flowers. Potatoes, with a string tied round them to mark where they are, and to facilitate their being taken out of the soil in which they are buried; and carrots similarly thrust into the earth where the wire-worm is ravaging, are successful lures. The vermin prefers these, buries itself in them, and may be easily removed. The roots of the white mustard also are said to drive the wire-worm away from the soil on which it is grown."—*Brit. Farm. Mag.*

Mr. Glenney says, "that Mr. May, nurseryman, Tottenham, plants the common daisy round his principal beds, finding the wire-worm prefer it to the carrot."—*Gard. Gazette*.

And Mr. Oram, Edmonton, says "that the double daisy is employed by one of his friends, who, in one summer, from a row of daisies three hundred feet long, has taken 2,000 wire-worms."—*Gard. Chron.*

WISE MEN'S BANANA TREE.
Musa Sapientum.

WISTARIA. Two species. Hardy deciduous climbers. Layers, and also cuttings. Light rich soil. *W. sinensis* requires the shelter of a wall, and to be pruned about the beginning of March; cut the leading shoots about half-way back, and spur the others in rather short.

WITCH HAZEL. *Hamamelis*.

WITHERINGIA. Seven species. Stove and green-house evergreen shrubs and herbaceous perennials. *W. purpurea* is tuberous rooted; *W. phyllantha*, a green-house annual. Cuttings or seeds. Light rich soil.

WITSENIA. Three species. Green-house herbaceous perennials. Offsets or seeds. Sandy peat.

WOLF'S BANE. *Aconitum lupulinum*.

WOOD ASHES. See *Ashes*.

WOODBINE. *Caprifolium Periclymenum*.

WOOD LEOPARD MOTH. See *Bombyx*.

WOODLICE. See *Oniscus*.

WOODROOF. *Asperula*.

WOOD SORREL. *Oralis*.

WOOLLEN RAGS. See *Animal Matters*.

WORKING is a gardener's term for the practice of grafting. "To work" upon a stock is to graft or bud it.

WORMS are beneficial in all the

compartments of the garden, acting as a kind of underdrainers, by their burrowings. To keep them from coming near the surface of lawns, it may be sprinkled with salt at the rate of five bushels per acre, three times a year, in spring, summer, and autumn. The most speedy destruction is brought upon them by dissolving two ounces of corrosive sublimate in every forty gallons of water, and applying this profusely on the grass infested. The worms come to the surface and may be destroyed by thousands. The sublimate is a virulent poison. Lime-water always must be an uncertain application, because even if the lime be fresh from the kiln, there is never any certainty of its being perfectly calcined, and every particle which remains combined with carbonic acid, is still chalk, and insoluble. The strength of lime water is consequently never uniform.

Worms should not be allowed to remain in garden pots, for they puddle the soil in so confined a space.

WORMIA *dentata*. Stove evergreen tree. Ripe cuttings, with the leaves on. Light loam, or loam and peat.

WORMWOODS. *Artemisia*. These are perennial rooted bitter aromatics, and cultivated solely for medicinal purposes. Common wormwood (*Artemisia absinthium*); Sea-wormwood (*A. maritima*); Roman wormwood (*A. Pontica*); Santonicum, or Tartarian wormwood (*A. Santonica*).

Soil.—The soil best suited to them is one that is dry, light, and poor, otherwise they grow luxuriantly, and are defective in their medicinal qualities, as well as in their power to withstand the rigour of the winter. Any situation will suit the common and sea wormwoods, that is open and unconfined, but the exotic species require to be sheltered from the severe aspects. In a severe winter, the Tartarian can only be preserved under a frame. The sea wormwood seldom flourishes, from the want of a genial soil; the application of salt would undoubtedly be beneficial.

Propagation.—They are all propagated by seed, as well as slips and cuttings, the first of which may be sown in March or April; and the latter planted during June, July, and beginning of August. The seed is sown thinly broadcast; and when the plants arrive at a height of two or three inches, are weed-

ed and thinned to six inches asunder; and those taken away pricked at a like distance; water being given if the weather is at all dry. The slips and cuttings are planted in a shady border, about eight inches apart, and water given regularly every evening until they have taken root.

The only cultivation required is to clear away the decayed stalks in autumn, and to keep them constantly clear of weeds by frequent hoeings. To obtain seed no further care is required than to gather the stems as they ripen in autumn. The Roman seldom perfects its seed.

WOUNDWORT. *Anthyllis vulneraria*.

WOUNDS. See *Extravasated Sap*.

WRIGHTIA. Four species. Stove evergreen trees and shrubs. Cuttings. Sandy loam and peat.

WULFENIA *carinthiaca*. Hardy herbaceous perennial. Division or seeds. Light rich soil.

WURMBEA. Four species. Greenhouse and half-hardy bulbous perennials. Offsets. Sandy peat and loam.

WYCH ELM. *Ulmus montana*.

XANTHORIZA *apiifolia*. Hardy evergreen shrub. Suckers. Common soil.

XANTHORRHÆA. Six species. Greenhouse evergreen shrubs, or herbaceous perennials. Offsets. Loam and peat.

XANTHOSIA *rotundifolia*. Greenhouse evergreen shrub. Cuttings or seeds. Loam, peat, and sand.

XANTHOXYLUM. Fourteen species. Stove and greenhouse evergreen and hardy deciduous trees and shrubs. Ripe cuttings. Common soil.

XERANTHEMUM. Three species. Hardy annuals. Seeds. Light rich soil.

XEROPHYLLUM. Four species. Hardy herbaceous perennials. Division or seeds. Peaty soil.

XIMENESIA. Five species. Hardy annuals and biennials, and greenhouse herbaceous perennials. Seeds. Common soil.

XIMENIA. Two species. Stove evergreen trees. Cuttings. Loam and peat.

XIPHIDIUM. Two species. Stove herbaceous perennials. Division. Loam, peat, and sand.

XIPHOPTERIS. Two species. One a stove, the other a greenhouse peren-

nial. Division or seeds. Loam and peat.

XYLOMELUM *pyriforme*. Green-house evergreen tree. Ripe cuttings. Loam, peat, and sand.

XYLOPHYLLA. Eleven species. Stove evergreen shrubs. Ripe cuttings. Loam and peat.

XYLOPIA. Three species. Stove evergreen shrubs. Ripe cuttings. Loam and peat.

YELLOW SULTAN. *Centaurea suaveolens*.

YELLOW-TAILED MOTH. See *Bombyx*.

YEW TREE. *Taxus*.

YUCCA. Adam's Needle. Thirteen species. Hardy, stove, and green-house evergreen shrubs, and a few hardy herbaceous perennials. *Y. pendula*, a variety of *Y. aloifolia*, is a hardy deciduous tree. Suckers. Light rich soil.

"Cut the flower-stem off *Yucca gloriosa* directly it has done flowering, and take away all the suckers, except two or three of the strongest. Then remove a little of the soil round the bottom of the plant, and replace it with a dressing of equal parts of sandy loam and cow-dung."—*Gard. Chron.*

ZAMIA. Twenty-one species. Stove or green-house herbaceous perennials. Suckers. Light sandy soil.

ZEBRA PLANT. *Catathia zebrina*.

ZEPHYRANTHES. Eleven species. Green-house and half-hardy bulbous perennials, and a few hardy and half-hardy herbaceous perennials. Offsets. Turfy loam, peat, and sand.

ZEXMENIA *tagetiflora*. Half-hardy herbaceous perennial. Seeds. Common soil.

ZICHYA. Three species. Green-house evergreen twiners. Young cuttings. Sandy loam and peat.

ZIERIA. Ten species. Green-house evergreen shrubs. Young cuttings. Sandy loam and peat.

ZIGADENUS. Five species. Hardy herbaceous perennials. Division or seeds. Peaty moist soil.

ZILLA. Two species. Half-hardy evergreen shrubs. Cuttings. Light rich soil.

ZINZIBER. Ginger. Thirteen species. Stove herbaceous perennials, except *Z. miega*, which belongs to the green-house. Division. Loam, peat, and sand.

ZINNIA. Eight species. Hardy annuals. Seeds. Rich mould, or common soil.

ZIZIA. Three species. Hardy herbaceous perennials. Division or seeds. Moist soil.

ZIZIPHORA. Seven species. Hardy annuals, *Z. acinoides* a hardy deciduous trailer, and the others half-hardy evergreen shrubs. The latter increase by cuttings, the former by seeds. Common soil.

ZIZYPHUS. Lotus. Fourteen species. Stove, green-house, hardy, and half-hardy evergreen, and a few hardy deciduous shrubs. The stove and green-house kinds increase by ripe cuttings, and succeed in loam, peat, and sand; the hardy kinds by ripe cuttings or layers, and require a rich soil.

ZORNIA. Seven species. Stove annuals and green-house herbaceous perennials. Seeds. Peat and loam.

ZYGOPETALUM. Six species. Stove orchids. Division. Peat and potsherds.

ZYGOPHYLLUM. Thirteen species. Green-house and stove evergreen shrubs. Cuttings. Loam, peat, and sand. *Z. prostratum* is a trailer; *Z. simplex*, a half hardy annual; and *Z. fabago* is increased by seeds only.

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 5. Phenomena of Volcanic Action.
- Palæontological and Geological Map of the British Islands. (Frontispiece.)

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 2. Physical Chart of the Indian Ocean.
 3. Physical Chart of the Pacific Ocean or Great Sea.
 4. Tidal Chart of the British Seas.
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1. Geographical Distribution of Plants.
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3. Geographical Distribution of Quadrumana, Edentata, Marsupialia, and Pachydermata.
4. Geographical Distribution of Carnivora.
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